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December 13, 1948

STEEL

The Magazine of Metalworking and Metalproducing

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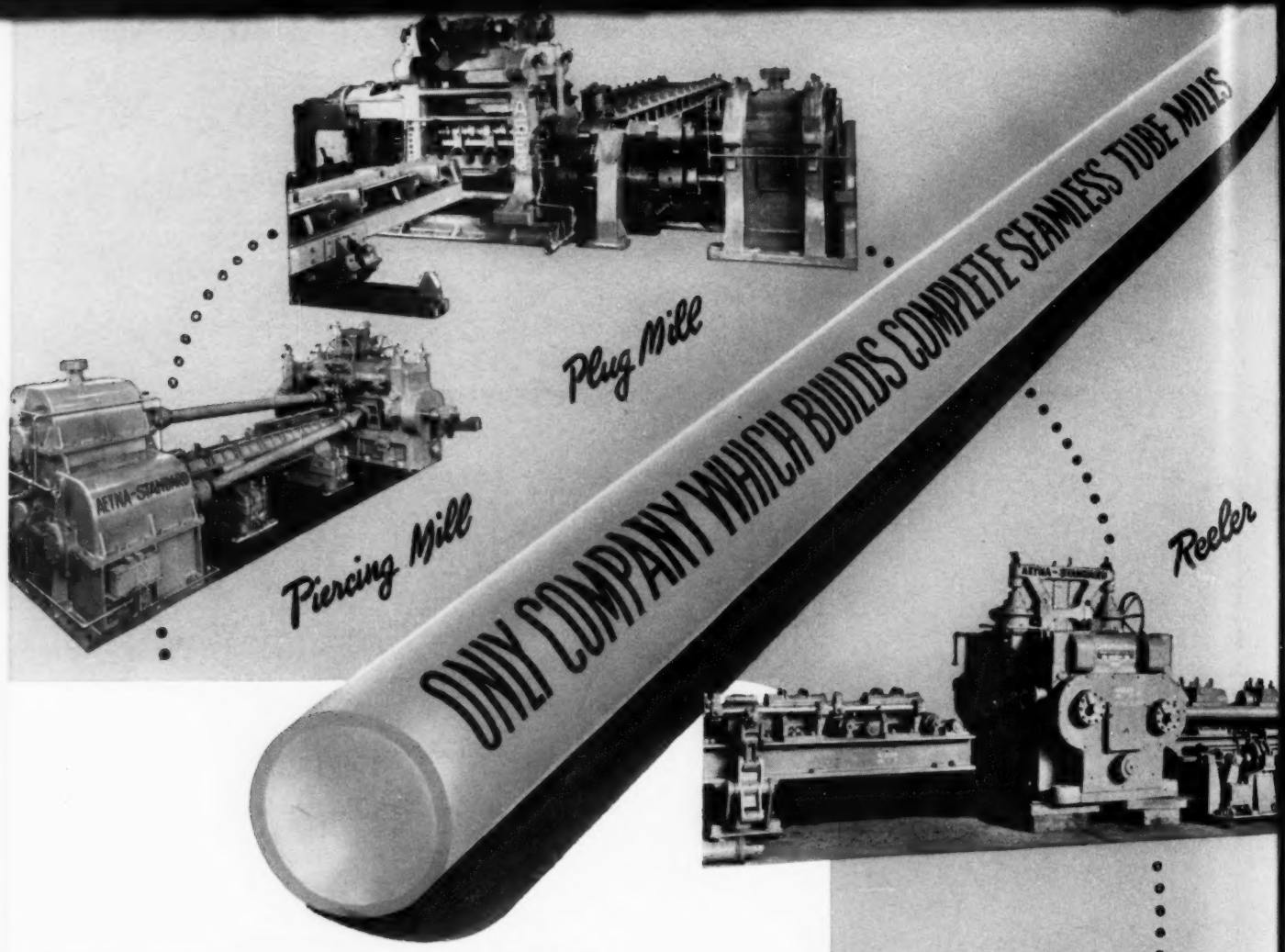

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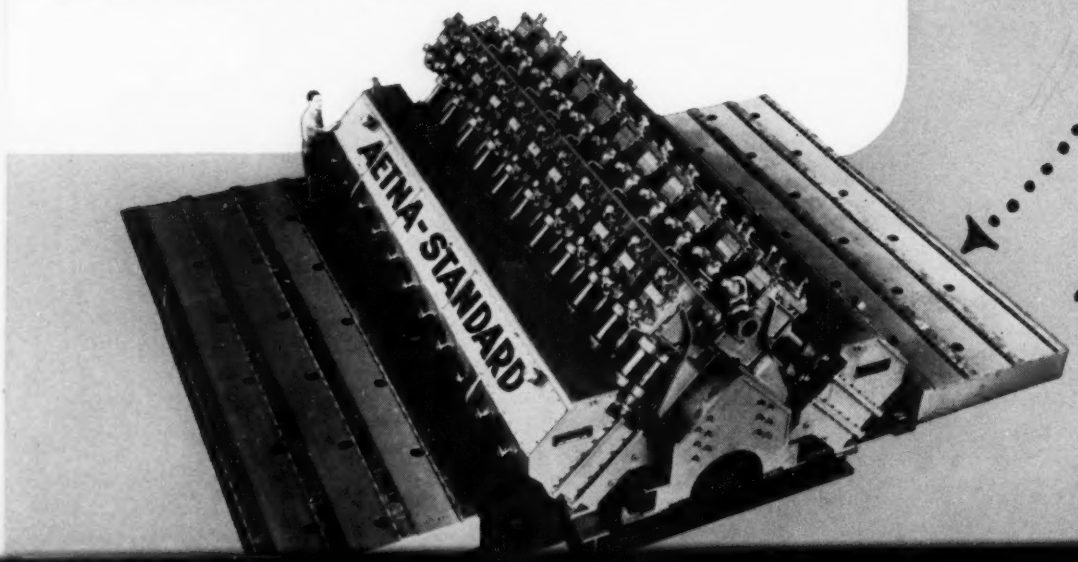

STEEL

The Magazine of Metalworking and Metalproducing

VOL 123, NO. 24 DECEMBER 13, 1948

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Just what is meant by

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?

Some 30 alloy steels, each identified by its American Iron and Steel Institute number . . . able to thwart attacks by chemicals and atmospheres over a wide range of concentrations, pressures and temperatures...carry the family name "Stainless."

The addition of chromium in excess of 11% to steel provides, according to most generally accepted theory, a thin, adhering self-healing oxide film that protects the underlying metal. The result is a series of alloys highly resistant to corrosion and tarnishing in a wide variety of corrosive media.

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In the annealed condition austenitic chromium-nickel stainless steels are strong, tough, ductile and pliable. When cold-worked they are effectively strengthened and hardened; a tensile strength in excess of 200,000 p.s.i. is easily developed. Annealed, and even in the cold-worked condition, they are adaptable to many forming operations. In all conditions they are readily weldable.

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Other elements are sometimes added to give specific properties: to improve machinability, enhance scaling resistance, improve resistance to corrosion in specific, difficult cases.

Leading steel companies produce austenitic chromium-nickel stainless steels in all commercial forms. A list of sources of supply will be furnished on request.

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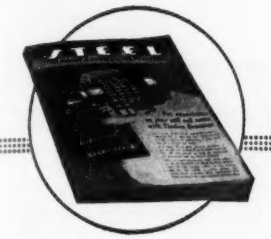

December 13, 1948

"More Flows Up"

In recent weeks in this space much emphasis has been placed upon the desirability of a more realistic approach to public relations on the part of American industry.

We have been trying to show that the present practice of spending vast sums in national "educational" campaigns, in which economic truths released from above are supposed to filter down to fertile soil, are wasteful and ineffective. We have been suggesting that campaigns designed to teach each industrial corporation how to practice good public relations at the plant level in its own community would be less costly and in the long run would be far more effective on a national basis than any campaign working from the top down ever could be.

It is gratifying to note that an excellent but inadequately publicized address presented at the recent Congress of American Industry of the National Association of Manufacturers provides an almost perfect case study of the procedure we have been advocating. Cloud Wampler, president of Carrier Corp., appeared on the program on Dec. 2 as a substitute for John McCaffrey, president of International Harvester Co. In concluding an admirable discussion on the unlimited possibilities of a working partnership between labor and capital, Mr. Wampler described employee and public relations activities conducted by the two Carrier plants in Syracuse, N. Y.

One project is the "Institute of Business," in which 210 Carrier employees in the lower compensation brackets meet once a week for 13 weeks on their own time to discuss economic and social problems and their application to the Carrier business. Another project is the "Cabinet," composed of 100 key men of the company, who meet monthly to discuss the same reports that are submitted to the board of directors.

Mr. Wampler stressed the point that in both of these projects "more information flows up, so to speak, than flows down." The pay-off is that Carrier has never had any so-called labor trouble—not even a single work stoppage. Also consider the influence which well-informed Carrier employees exert upon public opinion in the community.

If every industrial corporation in the nation were to do a job comparable to that which Carrier is doing, there would be no need for national campaigns.

* * *

ADJUSTMENT BY STAGES: Paradoxes are developing so rapidly in the national economy that it is difficult to read orthodox signs of the times accurately.

While the automobile industry established a new postwar weekly assembly record in the week ended Dec. 4 and already has produced more cars and trucks in 1948 than in the entire year of 1947, the demand for new higher priced models has slackened perceptibly.

Similarly, while the steel industry has been operating at over 100 per cent capacity and has broken the all-time record for weekly ingot output and while some steel consumers say steel is harder to obtain than ever, an increasing number of customers declare that the steel supply situation is easing. Also moderate to sizable cutbacks are reported in the operation of foundries and of plants of manufacturers of household appliances, typewriters, computing machines and some other items.

On the other hand, just as observers were trying to explain why the volume of engineering construction in November was off 30 per cent

(OVER)

from October and 5 per cent from November, 1947, the weekly volume for the week ended Dec. 2 hit a new peacetime high of $362.3 million.

Obviously one cannot establish definite trends on the basis of such contradictory evidence. Undoubtedly powerful factors are at work, adjusting various segments of our economy to a new base. Thus far these adjustments have not been violent enough to disturb the national averages.

The pertinent question is whether or not we can continue to stagger these piecemeal adjustments so that the inevitable adjustment of the whole can be accomplished in an orderly manner. —pp. 55, 60, 70, 147

* * *

CO - OPERATIVE SELLING: The farm equipment industry is typical of many metalworking industries in that it is composed of a few large companies and numerous smaller ones. For this reason there will be widespread interest in the progress of a co-operative sales organization that has been launched in the farm equipment field.

Eleven widely separated small companies have formed Independent Farm Industries, which will market the products of the co-operating companies. Obviously the plan is based upon the belief that the joint marketing operation will provide farmers with a service superior to that which any member company could render individually. Also it is reasonable to believe that the co-operating companies hope to develop for themselves some of the competitive advantages which heretofore have been enjoyed by their larger competitors. It is an interesting undertaking. —p. 58

* * *

JOHN BULL'S HEADACHE: Britain's labor government is pushing its drive for the nationalization of the steel industry against the backdrop of a steady improvement in steel supply. The bill providing for nationalization was read for the second time in the House of Commons just as government controls affecting the distribution of scarce steel were being eased. The vote of the house on the second reading was 373 for and 211 against. The opposition vote of 211 is one of the largest registered thus far by the present Parliament.

The size of this opposition vote renews hope in some quarters that the efforts of the labor government to take over Britain's steel industry ultimately will be defeated. Under British procedure, progress of the nationalization bill can be slowed to a snail's pace by the tactics of House committees and by amendments by the Lords. —p. 65

* * *

WELDS FROM ONE SIDE: Improvements in welding practice seem to develop with increasing frequency. One of the latest achievements is an inert gas-shielded arc spot weld technique which enables a manufacturer or fabricator to weld two lapped pieces from one side only.

There are numerous fabricating situations where the ability to spot-weld from the outside would be a decided advantage. This is made possible by an argon gas shield of the weld and a weld produced by fusion alone, which obviates the necessity of any backup operation or access to the reverse side of the weld assembly.

The control and timing of the functions involved in this type of spot welding are unique. Once the operator presses the trigger of the welding gun, which is about the size of a Colt "45" automatic, the routine necessary for a successful spot weld is followed faithfully and automatically. —p. 84

* * *

NEED 60,000-TON PRESS: Among the largest forging presses in the world today is a 30,000-ton unit built in Germany before the war and an 18,000-ton press in the plant of Wyman-Gordon Co. at Worcester, Mass. Now it has been proposed that a 60,000-ton hydraulic press be built.

In the past the demand for mammoth presses came largely from builders of heavy machinery and manufacturers of heavy ordnance items, such as gun forgings. Therefore, it is rather significant that the most enthusiastic advocates of the proposed 60,000-ton press are air force and aircraft industry officials. They claim that a press of this capacity would solve important military problems and open up an entirely new field of peacetime applications.

For instance, manufacture of an A-26 wing spar cap by ordinary construction methods requires 275 separate parts and the cost per cap is $267. With an ultra-high tonnage press the cost would be $85 per cap and the amount of material required would be cut in half. —p. 112

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

BUSINESS OUTLOOK— Sales of some goods, notably consumer items, has slackened (p. 60, 61, 70) and a number of manufacturers are reducing labor forces (p. 61). However, industrial production remains at a postwar high (p. 74) and demand for steel continues far in excess of supply even though the steel industry's capacity, still being expanded, has increased more percentagewise than the population growth in the last 10 years (p. 55). However, a committee of the Investment Bankers Association reports American industry has passed the peak of its postwar expansion and improvement (p. 56) and that next year the overall need of companies for new capital will decline considerably.

SAYS FREIGHT ABSORPTION'S OK— Freight absorption is not out and the Supreme Court decision in the Cement Case has not deprived businessmen of the honestly and independently exercised right to meet competition (p. 58), Robert E. Freer, chairman, Federal Trade Commission, declared. The notion that actual freight costs must now be added on every shipment of goods and that a businessman cannot absorb freight to meet competition is all wrong, he asserted. Meanwhile, a new group, the National Competition Committee, has been formed (p. 58) to push for Congressional action to specifically legalize delivered pricing. Three of the leading steel producers, U. S. Steel, Republic Steel and Bethlehem Steel, advised the Senate Trade Policies Committee they will resume freight absorption if it is legalized (p. 58) in competition for desirable business where cost is not prohibitive.

SCRAP DRIVE— To keep steel mill operations at a high level and to build an emergency stockpile of 3 million tons, a scrap drive among industrial plants (p. 59) will be sponsored by the Office of Industry Cooperation. Sought will be obsolete and unusable machinery, dies, jigs, fixtures, etc. Also, Japan's scrap supplies will be surveyed, with a view of determining how much can be brought back to the United States, a policy that would be in contrast with a prewar one under which millions of tons went to Japan and helped that country prepare for war against the U. S.

RECOVERING— Postwar production records are being set in almost all western European nations (p. 65), except France where the picture is spotty. Even greater gains in some of the countries are expected when capital expansion programs under way are completed.

COST CONSCIOUS— To combat a steadily rising break-even point, many Cleveland manufacturers have installed more efficient machinery, are utilizing cost controls to a greater extent, driving for quality in products and calling for all-out effort on the part of employees (p. 67). Retooling within the past year has in some instances boosted production 30 per cent.

HOLLYWOOD STYLE— In super colossal style, General Motors Corp. will display its products (p. 69) at a show in New York, Jan. 20-27. With a theme, "Transportation Unlimited," GM may outdo Ford Motor Co.'s extravaganza of last June. The showing is aimed to be not only an index of the present but also of the future trends in all modes of transportation.

HERE AND THERE IN INDUSTRY— Maintenance and repair charges in the steel industry have gone higher than ever before during war or peace, amounting to $692,200,000 in 1947 (p. 56) . . . Growing competition among farm equipment makers helped spur 11 companies to form a nationwide marketing organization (p. 58) . . . Shipments of steel products in October totaled 5,952,008 tons, largest since March (p. 57). Of total steel ingot production in the first ten months of 1948 nearly 10 per cent, or 7 million tons, was alloy (p. 56) . . . Carpenter Steel Co., Reading, Pa., has opened a new laboratory building (p. 72) . . . A sheet rolling mill at Indianapolis has been sold (p. 72) by Whitney Steel Corp. to Royal Industrial Corp., New York . . . General Electric Co.'s production of large turbine-generators for electric utilities plants during the past year exceeds that of any previous year (p. 72) by more than a million kilowatts.

Engineering News, p. 83 *Market Summary, p. 147*

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RYERSON STEEL

STEEL
A PENTON PUBLICATION

Pressure for Steel Easing?

Slackening in some consumer goods not yet noticeably reflected in steel demand. Producing capacity still rising after sharp gains of recent years

HOW LONG will the demand for steel exceed supply?

That's one of today's top questions. Soft spots are appearing here and there in the economy and steel buyers are reported beginning to display more caution in ordering. Still, whatever letup is developing in demand from some directions appears being taken up from others, so that no more than a slight easing in the pressure on the steel mills is noted. As of the moment steel producers feel reasonable supply-demand balance is still months distant.

Production of steel for ingots and castings, long at a high level, has recently been at 100 per cent of capacity, with the tonnage outturn setting new alltime records. Yet orders continue to outdistance production. Steel still is moving in the gray market at premium prices but demand in this area is less pressing than it has been in recent months.

Because of the basic importance of steel in the nation's economy, the inability to fill immediately all the orders for steel has for the past two years kept alive among consumers, businessmen, economists and government officials the question whether the nation's steel producing capacity is any longer adequate for a country whose per capita consumption of steel has been continually rising while the population has been increasing.

Facilities Increased—But what has happened to capacity? The American Iron & Steel Institute, New York, reports that for ingot making facilities it has increased 17.5 per cent, or more than 14 million tons, in the 10 years since 1938. Meanwhile, the population of the continental United States has increased approximately 12.5 per cent. Along with this steel capacity increase the country's blast furnace capacity has expanded about 19 per cent.

Additional Increases Coming—Further rises in the industry's capacities will occur as expansion and improvement programs undertaken since the war are completed. These programs involve expenditures totaling nearly $1.7 billion.

Among the industry's increases is a rise in capacity for making electric furnace steel. In 1938 it was 1,490,000 tons. Now it is 5,397,000 tons.

More Finishing Capacity—Along with the increases in capacities for making pig iron and steel ingots, there have been increases in finishing capacities. For instance, hot-rolled sheet and strip capacity now at 26,589,460 tons is 35 per cent above that of 1938, while cold-rolled sheet and strip capacity is now 11,413,785 tons, a 55 per cent increase.

Other 1948 capacities and percentage increases over 1938 include: Plates, 7,865,700 tons, 28 per cent increase; hot-rolled bars, 12,008,260 tons, 17 per cent; cold-finished bars, 3,217,260 tons, 87 per cent; heavy structural shapes and piling, 5,484,330 tons, 25 per cent; and wire rods, 6,195,170 tons, 27 per cent.

Steelmaking capacity of four western states, California, Oregon, Utah and Washington, increased 272 per cent in the last 10 years, while their combined blast furnace capacity rose 815 per cent and their total hot-rolled capacity about 310 per cent to 3,210,600 tons.

In Alabama, Georgia, Kentucky, Maryland, Tennessee and Virginia steel ingot capacity increased 36 per cent and blast furnace and hot-rolled capacities, 40 per cent each.

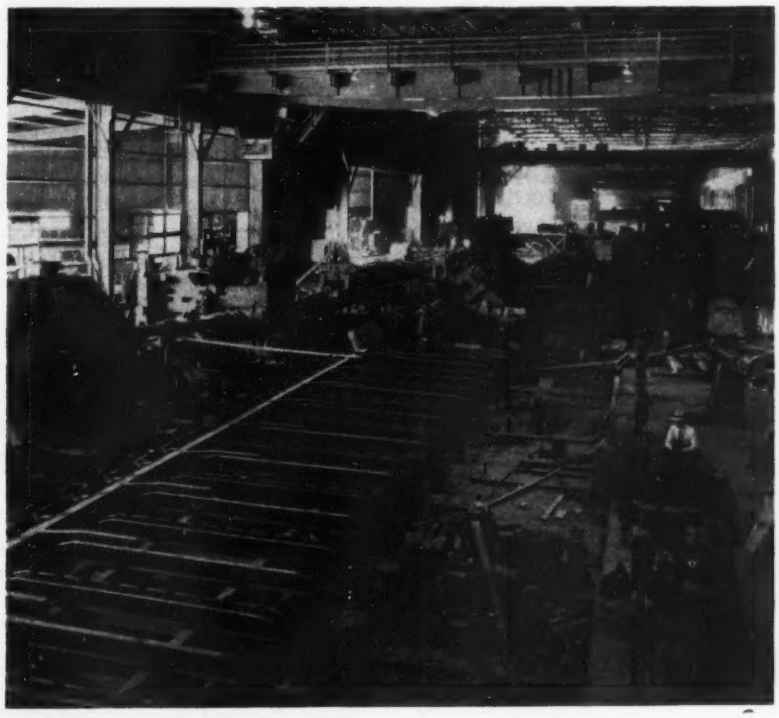
Inland Expanding Facilities

INLAND STEEL CO. will increase its overall steel capacity and its facilities for producing tin mill products. Although work on both programs is under way, it will be 1950 and 1951 before major benefits will be realized from both.

The company's ingot capacity, now 3,400,000 tons a year, will be raised from 15 to 20 per cent. The increase will be accomplished by enlarging existing furnaces, rebuilding and strengthening of buildings in which they are located, by installing heavier equipment such as cranes and ladles, and by expanding use of oxygen in open hearths.

Production capacity of tin plate and other tin mill products, now estimated at 4 million boxes a year, will be boosted to 6 million by addition of new and more efficient finishing facilities and installation of an additional electrolytic tinning line.

Enlargement of cold-rolled sheet



Enlargement and improvement of steel industry capacities includes an innovation in new equipment at National Tube Co.'s Lorain, O., plant to eliminate several steps and speed production of seamless pipe

facilities, begun in 1946, will be completed late next spring but full effectiveness of this program will be dependent on expansion of the company's ingot producing facilities. The company also is installing a new battery of coke ovens and is building a new ore freighter that will be the largest on the Great Lakes.

Warns on Steel Expansion Cost

WARNING that too much pressure by the government for expansion of steel production facilities could be disastrous for industry was sounded last week by Frank Purnell, president, Youngstown Sheet & Tube Co., in an address to the Greater Youngstown Area Foundation.

Mr. Purnell said it is extremely essential that the industry be kept profitable if the industry is to have expansion and modernization and provide for replacements. He contended that current high steel plant construction costs would force a big increase in steel prices if any new plants were to be profitable.

Construction costs amount to $250 to $300 a ton of yearly ingot capacity, and it would cost $1 billion to replace his own company's capacity at present costs, he said.

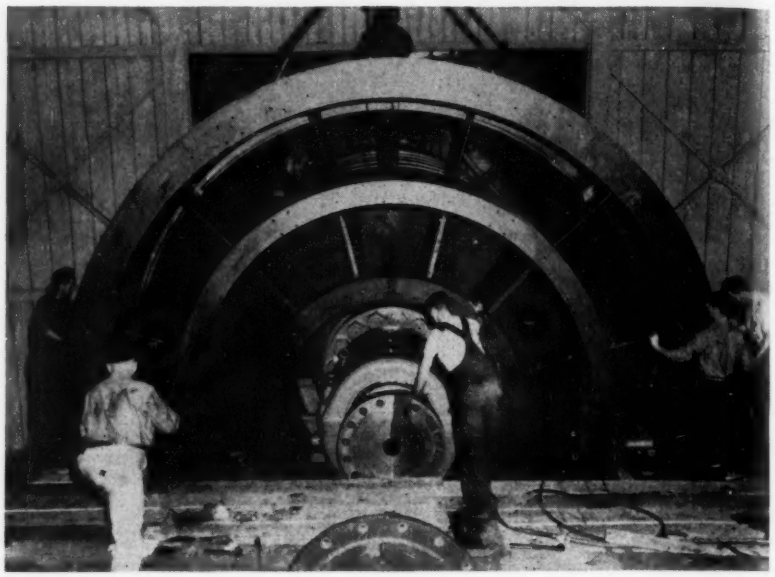
Charges such as depreciation and interest alone would add $30 a ton to the cost of producing steel, he declared, pointing out that the steel industry never made half that much at any time.

Expects Decline in Expansion

AMERICAN INDUSTRY has passed the peak in the program of postwar expansion and improvement. That's the conclusion of the Investment Bankers Association industrial securities committee, which foresees a considerable decline in the overall need of firms for new capital in 1949.

Making its report at the association's annual convention last week at Hollywood, Fla., the committee cited four industrial giants which proceeded with plant expansion immediately at the end of World War II. "Companies such as these which made an early start in their postwar spending programs are apparently scheduled to cut back their outlays by one-third or more in 1949 as compared with 1948," the committee said.

Concerns which have witnessed a downturn in demand for their products will cut back more sharply. Yet manufacturers as a group are not expected to cut back by more than 20 per cent, and other enterprises in the mining, railroad, public utilities and commercial fields may well hold their budgets at a high level with a result that total business expenditures may be down only 10 per cent, the committee added.



WIND MAKER: To drive this axial-flow blower in a government laboratory's supersonic wind tunnel at Cleveland, three General Electric motor units capable of a total of 100,000 horsepower will be coupled on a single shaft, making it the world's most powerful motor installation on a single shaft

Steel Maintenance Costs Up

MAINTENANCE and repair charges of the steel industry have gone higher than ever before during war or peace, according to American Iron & Steel Institute. Estimated total of $692,200,000 in 1947 was 41.3 per cent higher than in 1946.

The cost of maintenance and repairs per ton of hot-rolled iron and steel products made was $10.46 in 1947, also a higher figure than ever before. This was 8.7 per cent higher than the estimated cost of $9.62 per ton during 1946, the previous record.

Wages represent the largest single item in the expenditures for repairs and maintenance.

It is believed that repair and maintenance costs during 1949 will be high also. Transportation charges have risen during the past year, and wage rates are currently the highest in the history of the iron and steel industry. Raw materials necessary for operation and repair have risen in price. Some of them have risen more than the price of steel.

Steel Output Record Indicated

STEEL ingot and castings production in the first 11 months of this year totaled 80,737,806 net tons, the American Iron & Steel Institute reported last week. Indications now are the full year's output will total around 88,500,000 tons, a new peacetime record. Output in the first 11 months was 5 per cent greater than in all of 1947.

During November output amounted to 7,763,216 tons, which compares with 7,987,112 tons in October. Production during the month was larger on a daily basis than in any month in history, and was at an annual rate exceeding 94,600,000 tons, or about 5 million tons higher than the best previous year's actual output.

Alloy Steel Output Soars

ALLOY steel production in the first 10 months of 1948 was equal to nearly 10 per cent of total output of ingots and steel for castings, and amounted to nearly 7 million net tons, or 909,000 tons more than in the like 1947 period, according to American Iron & Steel Institute.

In prewar years alloy steel production averaged 6 per cent of total steel output.

Most of the gain in alloy steel output in 10 months over the similar 1947 period was due to open-hearth alloy production, rather than electric furnace output.

Electric furnace production has been setting monthly records, and in 10 months the total of such ingots and steel for castings was nearly 4,-

677,500 tons, or 975,000 tons greater than a year earlier. Most of this increase in electric furnace output was in carbon steel.

In October electric furnace operations had risen to 101.5 per cent of capacity, after an average for 9 months of 89.4 per cent.

Steel Product Shipments Rise

SHIPMENTS of steel products increased 440,534 tons in October over the previous month's total to 5,952,008 tons, the largest since March, according to the American Iron & Steel Institute. This brought the 10-month total to 54,183,115 tons, or an increase of nearly 1,880,000 tons over the 52,303,903 tons recorded for the like 1947 period.

Although the product mix has remained fairly steady this year, shipments of plates in October increased to the highest level since early in 1947 at 641,351 tons. There were also substantial increases in shipments of heavy structural shapes to 391,889 tons from 333,533 tons in September, of hot-rolled bars to 855,605 tons from 817,751 tons, of cold-finished bars to 151,776 tons from 135,119, of seamless pipe and tubes to 267,690 tons from 232,667 tons.

Comparison of totals for the first 10 months of this year with those for the like 1947 period show the largest increases were recorded in the following products: Plates, 5,712,951 and 5,241,439 tons; butt weld pipe and tubes, 1,659,575 and 1,403,272 tons; electric weld pipe and tubes, 1,297,965 and 901,602 tons; seamless pipe and tubes, 2,389,457 and 1,719,250 tons; electrolytic tin plate, 1,461,608 and 1,298,464 tons; hot-rolled sheets, 6,411,939 and 6,008,936 tons; cold-rolled sheets, 5,630,180 and 4,494,304 tons; galvanized sheets, 1,360,723 and 1,340,901 tons.

Mill Patent Decision Affirmed

UNITED STATES Court of Appeals, Sixth District, has affirmed a decision of the District Court in Cleveland when dismissing a motion by the United States government for temporary injunction and impounding of $9,749,000 paid into the registry of the Cleveland court for settlement of claims, against a number of steel companies, for alleged infringement of steel mill patents owned by Cold Metal Process Co., Youngstown.

The government had contended the fund and payments thereto should be taxed under the Royalties Adjustment Act of 1942, whereas the court decision held payments were not royalties and therefore exempt from taxes as such.

The litigation named the following as defendants: Youngstown Sheet & Tube Co., American Rolling Mill Co., Bethlehem Steel Co., Jones & Laughlin Steel Corp., Wheeling Steel Corp., Inland Steel Co., Crucible Steel Co. of America, Allegheny Ludlum Steel Corp., Wallingford Steel Co., Signode Steel Strapping Co., Crown Cork & Seal Co., Cold Metal Process Co., and the Union National Bank of Youngstown as trustee for the Leon A. Beegly fund.

Drops Plan To Buy Steel Plant

BORG-WARNER CORP., Chicago, announced it has terminated negotiations for purchase of Copperweld Steel Co.'s plant at Warren, O.

No reason was given for ending discussion, B-W announcing merely that negotiations have been inconclusive and have been terminated.

SHIPMENTS OF STEEL PRODUCTS FOR OCTOBER AND YEAR TO DATE

Steel Products	Number of companies	Items	OCTOBER - 1948			To Date This Year			Whole Year 1947		
			Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	45	1	286,420	4.8	287,128	*2,572,256	4.8	2,721,013	2,966,748	4.7	2,396,343
Structural shapes (heavy)	12	2	391,889	6.6	1,958	3,493,341	6.5	20,981	4,436,129	7.0	2,640
Steel piling	4	3	25,848	0.4	120	245,967	0.5	1,324	324,224	0.5	23
Plates (sheared and universal)	29	4	641,351	10.8	33,595	5,712,951	10.6	310,125	6,345,216	10.1	219,227
Skelp	6	5	6,453	0.1	58,226	* 59,710	0.1	* 435,124	160,989	0.3	384,004
Rails—Standard (over 60 lbs.)	4	6	173,433	2.9	1,395	1,630,296	3.0	10,736	2,207,146	3.5	991
—All other	5	7	16,867	0.3	48	181,339	0.3	991	211,900	0.3	329
Joint bars	7	8	11,137	0.2	3,488	113,747	0.2	34,397	173,923	0.3	15,198
Tie plates	7	9	38,207	0.6	1	408,549	0.8	338	504,779	0.8	4,437
Track spikes	8	10	13,359	0.2	15	119,193	0.2	573	163,746	0.3	146
Hot Rolled Bars—Carbon	34	11	534,788	9.0	57,424	*5,105,520	9.4	512,141	6,242,416	9.9	745,770
—Reinforcing—New billet	16	12	121,752	2.0	822	*1,108,448	2.1	5,702	1,277,075	2.0	9,775
—Rerolled	13	13	20,836	0.4	-	178,286	0.3	-	175,833	0.3	-
—Alloy	27	14	178,229	3.0	17,510	1,575,011	2.9	186,754	1,741,432	2.8	212,382
—TOTAL	44	15	855,605	14.4	75,756	7,967,265	14.7	704,597	9,436,756	15.0	967,927
Cold Finished Bars—Carbon	28	16	128,105	2.2	761	1,105,719	2.0	5,517	1,426,701	2.3	9,249
—Alloy	27	17	23,671	0.4	649	* 193,373	0.4	6,050	218,802	0.3	2,601
—TOTAL	35	18	151,776	2.6	1,410	*1,299,092	2.4	11,567	1,645,503	2.6	11,850
Tool steel bars	18	19	7,982	0.1	90	72,808	0.1	1,411	87,279	0.1	1,670
Pipe & Tubes—Butt weld	16	20	183,840	3.1	2,159	1,659,575	3.1	23,070	1,892,691	3.0	78,080
—Lap weld	8	21	32,054	0.5	-	283,637	0.5	3	389,762	0.6	875
—Electric weld	13	22	154,239	2.6	570	1,297,965	2.4	4,408	1,254,325	2.0	4,274
—Seamless	17	23	267,690	4.5	12,741	2,389,457	4.4	140,073	2,581,106	4.1	157,208
Wire rods	21	24	54,647	0.9	21,645	504,161	0.9	252,995	667,282	1.1	331,192
Wire—Drawn	39	25	240,734	4.1	14,645	2,202,765	4.1	146,667	2,590,963	4.1	181,783
—Nails and staples	17	26	77,116	1.3	1,195	715,934	1.3	10,867	799,436	1.3	8,481
—Barbed and twisted	15	27	20,567	0.3	26	210,391	0.4	426	256,991	0.4	128
—Woven wire fence	13	28	33,188	0.6	269	331,519	0.6	3,100	407,295	0.6	3,616
—Bale ties	11	29	9,400	0.2	-	99,351	0.2	-	119,917	0.2	-
Black Plate—Ordinary	9	30	75,861	1.3	-	671,416	1.2	654	801,745	1.3	2,033
—Chemically treated	2	31	1,879	-	-	12,442	-	-	19,252	-	-
Tin and Terne Plate—Hot dipped	9	32	192,329	3.2	-	1,775,722	3.3	259	2,093,149	3.3	228
—Electrolytic	9	33	157,747	2.7	-	1,461,608	2.7	215	1,617,659	2.6	529
Sheets—Hot rolled	32	34	690,775	11.6	57,909	6,411,939	11.8	528,824	7,891,798	12.5	578,426
—Cold rolled	16	35	627,584	10.5	1,496	5,630,180	10.4	16,874	5,504,578	8.7	28,498
—Galvanized	16	36	144,438	2.4	283	1,360,723	2.5	2,419	1,609,881	2.5	889
Strip—Hot rolled	23	37	153,775	2.6	39,493	1,374,285	2.5	307,601	1,740,085	2.7	308,655
—Cold rolled	34	38	161,000	2.7	2,089	1,462,076	2.7	20,535	1,613,005	2.6	28,030
Wheels (car, rolled steel)	5	39	33,267	0.6	65	276,655	0.5	946	356,873	0.6	2
Axles	5	40	19,551	0.3	2	174,800	0.3	118	185,019	0.3	53
All other	-	41	-	-	-	-	-	-	-	-	-
TOTAL STEEL PRODUCTS	140	42	5,952,008	100.0	617,817	*54,183,115	100.0	*5,713,231	63,057,150	100.0	5,717,765

* Adjusted.

Denies Freight Absorption Out

FTC Chairman Freer tells New York Sales Executive Club the Supreme Court decision in the Cement Case did not ban right of business to meet competition

DECISION of the U. S. Supreme Court in the Cement Case has not "thrown freight absorption out the window" and has not deprived businessmen of the honestly and independently exercised right to meet competition, Robert E. Freer, chairman, Federal Trade Commission, declared last week in an address before the Sales Executives Club of New York.

Commissioner Freer, who is retiring from the commission Dec. 31 after more than 13 years' service, said that many businessmen have been misinformed about the effect of the FTC ruling and the Supreme Court decision in the Cement Case which ban the basing point system of pricing as used in that industry.

He declared that the notion actual freight costs must now be added on every shipment of goods and that a businessman cannot absorb freight to meet competition is all wrong.

Precedent Denied—"I will further state as strongly as I know how," he said, "that no businessman acting in a genuinely competitive way need fear that the decisions in either the Cement Case or Rigid Steel Conduit Case will be used as precedents for declaring his competitive conduct unlawful."

The FTC commissioner held the crux of the current controversy over basing points lies in the effort in certain business circles to write an amendment into the law to the effect that the mere fact that everyone in an industry is employing a basing point or other organized system of selling at identical prices shall not be considered as evidence of agreement in an anti-trust proceeding.

Set Laws Back—Such legislation, he said, would set the antitrust laws back more than 50 years and would accelerate a trend toward government regulation of business. The courts and the commission should continue to have the right to make proper and reasonable inferences from all the facts and circumstances if the antitrust laws are to be effective at all, he insisted.

"I know of no instance in which the commission has proceeded against any industry solely on the basis of identical prices," he said. "I know of no contemplated proceeding involving this issue. But, the commission and the courts should continue to be free to examine all of the circumstances of industry action including the fact, as in the Cement Case and as in the Rigid Steel Conduit Case, that prices remained identical and relatively inflexible over long periods of time."

Steelmakers Want Base Pricing

STEEL producing companies will resume freight absorption in selling competitively if permitted to do so legally, it was indicated last week.

Three of the largest producers, United States Steel Corp., Bethlehem Steel Co. and Republic Steel Corp., advised the Senate Trade Policies Committee, investigating the effects of the ban on basing point and similar pricing, they would resume former pricing methods. Indications were, however, they would not use freight absorption or equalization as extensively as in the past.

Recently the question was raised whether the steel producers would resume former pricing even if permitted to do so in view of the fact their net mill prices have been substantially increased through the passing along of full freight charges to consumers.

United States Steel advised the committee it "deplored the necessity for the change and considers it a serious disadvantage to ourselves and our customers."

Bethlehem Steel Corp. said if permitted to do so "we undoubtedly would absorb freight to the extent necessary to meet competition on desirable business where the cost is not prohibitive."

Republic Steel Corp. said that if the right to absorb freight is restored by legislation "we will in the future avail ourselves of it on steel business offered by steel purchasers whose plants are located closer to our competitors when we feel we can profitably do so."

Says Pricing Fears Unwarranted

SMALL business was told last week to allay its fears over pricing methods until the Supreme Court or Congress takes further action on the question.

The Small Business Advisory Committee of the Federal Trade Commission is studying the problem before industry with a view to clarifying the present uncertainty. The committee is headed by Harold M. Moss, Philadelphia, and was selected by the Conference of American Small Business Organizations, Chicago. However, it is not responsible to the conference.

The advisory group said in a statement that three days of closed door conferences with Federal Trade Commission officials convinced members of the committee that the dilemma arising from the Supreme Court decision in the Cement Case involving the legality of freight absorption is unwarranted.

New Group Fights f.o.b. Pricing

BUSINESS and industry will make a strong bid for legislation of a delivered price system during the next session of Congress. First indication of a unified nation-wide effort came with the announcement of formation of the National Competition Committee in Pittsburgh recently.

The new co-ordinating committee had its beginning early in September when a group of industrialists concerned about the implications of the Supreme Court decision in the Cement Case, gathered in Pittsburgh to form the first local chapter. Since then chapters have formed and are active in Tulsa, Dallas, Houston, Cincinnati, Dayton, Cleveland, Pittsburgh, and Philadelphia. Others are forming in principal cities.

The first national meeting was presided over by John P. Roche, vice president, Heppenstall Co. Next meeting is scheduled for Cincinnati around Dec. 20.

Farm Machinery Competition Seen

GROWING competition among farm equipment manufacturers has been cited as one of three reasons for formation of a nation-wide marketing organization, representing upon inception 11 widely separated companies.

The sales group, Independent Farm Industries, has established headquarters at 205 W. Wacker Drive, Chicago, and regional sales offices in New York and Detroit. Within a few weeks an office will also be opened on the West Coast.

It is headed by C. R. Powers, president, who left Dearborn Motors Corp. for the post; George B. Wells, secretary-treasurer, who had been a Detroit attorney and was formerly with the tax division of General Motors Corp.; and J. F. McRoberts, one-time director of personnel of Vickers Inc., Detroit.

Various Lines Involved—The companies initially co-operating in the marketing venture are: A. F. Wag-

ner Iron Works, Milwaukee; Pittsburgh Forging Co., Pittsburgh; Southern Iron & Equipment Co., Atlanta; Wiard Plow Co., Batavia, N. Y.; Air Cleaner Service Co., Denver; Farm Rite Implement Co., Chicago; Central Architectural Iron Works, Chicago; Phillips Foundry, Bakersfield, Calif.; Baldwin Mfg. Co., Cleveland; Independent Plow Co., Neodesha, Kans.; and Orley Freezer Inc., Detroit. Several additional companies are planning to join IFI soon.

A complete line of plows, harrows, cultivators, planters and other farm machinery is being handled, and IFI is planning in February to bring out a new, rear-engine tractor embodying a number of features not previously available in any one tractor. Products will continue to bear the manufacturers' trade-marks but will also be identified with IFI through a distinctive insignia and a royal blue color.

Country-wide Distribution — The sales organization, according to Mr. Powers, provides country-wide distribution opportunities for independent producers, gives dealers a complete line of farm equipment, and makes available to farmers equipment of "unmatched versatility, under an arrangement which will give them the benefits of tremendous engineering know-how and the economies made possible by simplified distribution methods."

Scrap Drive Planned

Commerce Department sponsoring campaign to build emergency stockpile of 3 million tons

INDUSTRIAL PLANTS shortly will be asked to participate in a new nation-wide iron and steel scrap drive by digging out and disposing of all obsolete and unusable machinery, dies, jigs, fixtures and the like. The drive will not be extended to householders.

Purpose of the drive being sponsored by the Office of Industry Cooperation, Department of Commerce, as well as Secretary Charles Sawyer in person, is to maintain steel mill operations at a high level and to build an emergency stockpile of some 3 million tons.

Alex Miller, adviser on scrap to OIC, points out that the steel industry will use a new record total of between 29 and 30 million tons of purchased scrap this year, against 26 million in 1947. Few ships will be scrapped from now on which means that the source for a large monthly tonnage will be cut off.

Foreign Agreement—An agreement finally has been worked out with the British so that this country now will get about 100,000 tons a month. Previously, the British were reported to have taken out 9 million tons of material as "booty" scrap, which included not only scrap but steel ingots, finished steel and usable machinery. After July 16, the British were allowed an additional 75,000 tons of "booty" but this now has all been taken out. Latest estimates indicate there are 15 to 18 million tons of scrap in Germany or enough to take care of the local economy, plus exports.

Secretary Sawyer also has revealed that Japan's supplies of scrap will be surveyed with the view of determining how much can be brought back to this country, thus slightly reversing the flow of millions of tons shipped to Japan by American scrap dealers prior to the war. Japan received an average of 334,548 tons monthly in 1939, 263,274 tons monthly in 1940.

Favors Seaway and Canal Plans

FRANK Purnell, president, Youngstown Sheet & Tube Co., Youngstown, favors construction of the St. Lawrence Seaway—Provided it can be built at the same time with the Lake Erie-Ohio river waterway.

Both the St. Lawrence Seaway and the Lake Erie-Ohio river waterway are likely to be brought up for authorization in the next session of congress.

The Seaway would enable both the larger lake vessels and ocean vessels to operate via the St. Lawrence in

ENDORSE SAFE SHIPPING PROGRAM: Representatives of truck and rail transportation agencies have endorsed a safe-transit program formulated by the Porcelain Enamel Institute to reduce damage to porcelain enameled products in shipment. Photographed during a recent PEI meeting in Chicago are, left to right, front row: Prof. F. A. Petersen, Enameled Utensil Manufacturers Council; Maurice R. Ely, National Electric Sign Association; W. L. Yingling, American Trucking Associations; E. H. Shands, PEI; R. F. Bisbee, PEI; A. L. Green, Association of American Railroads; H. R. Folgers, National Electric Manufacturers Association. Back row: Dana Chase; E. L. Manthei, Impact Register Co.; Ray H. Thompson, American Washer & Ironer Manufacturers Association; J. C. Van Nordstrand and A. E. Dowling, both of the Railway Express Agency; C. S. Bather, PEI; H. George D. Nutting, L.A.B. Corp.; Harold Massey, Gas Appliance Manufacturers Association; Ed Zelinski, NEMA

and out of the lakes. An Army Engineers' report on the Lake Erie-Ohio river waterway is now being considered by the Board of Army Engineers for Rivers and Harbors. It would extend from a point near Ashtabula on Lake Erie to Beaver, Pa., on the Ohio river.

Traffic Needed—Mr. Purnell said he felt the Ohio and Mississippi river cities wouldn't get much benefit from the St. Lawrence project unless the 105-mile eastern Ohio-western Pennsylvania canal is opened. Greater area served by two waterways would justify the huge expenditure of federal funds, he said.

Charles M. White, president, Republic Steel Corp. and George M. Humphrey, president, M. A. Hanna Co., Cleveland, recently changed to support of the St. Lawrence project.

Development of the Labrador iron ore deposits recently has brought renewed interest in the St. Lawrence project as a means of getting the ore to inland mills.

West Needs More Capacity

Industrialist says western demand for steel runs 1 million tons above area production

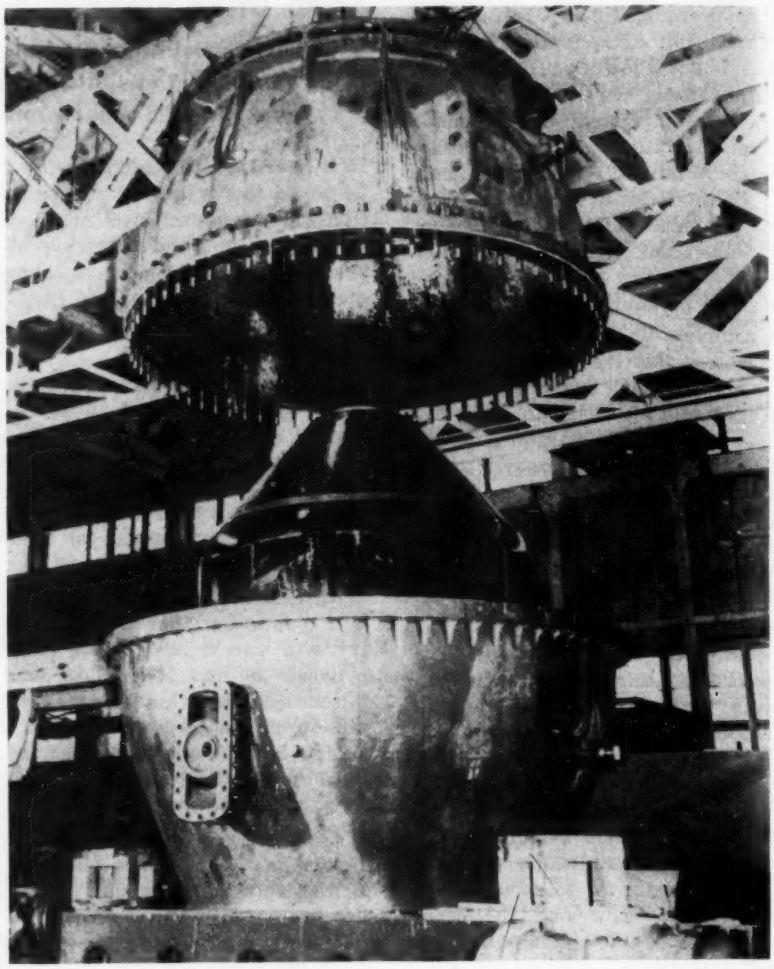
GROWING need for increased steel productive facilities on the West Coast is indicated by current supply and demand factors, according to H. H. Fuller, president, Bethlehem Pacific Coast Steel Corp.

Mr. Fuller pointed out that the western states now are producing about 3,850,000 tons of steel ingots annually, and "the yield from this supply approximates about 3 million tons of finished products annually." However, he continued, current demand in the West is running at a rate of about 4 million tons of finished products a year, leaving a deficit of about 1 million tons.

Bring In Eastern Steel—"To make up this difference," Mr. Fuller said, "the West must bring from eastern mills the remaining million tons, plus almost as much more tonnage per year because the West's product mix does not provide the full requirement of several of the major tonnage items."

But, he pointed out that as a result of the recent establishment of steel prices on an f.o.b. mill basis, many eastern and midwestern steel producers are withdrawing from the West Coast market.

Increased production on the West Coast, Mr. Fuller believes, is the solution to the problem of meeting the greater western demand for steel. However, he pointed out that the extent to which western steel capacity can be expanded is determined by the supply of scrap, which continues to be in short supply on the West Coast.



NO ORANGE SQUEEZER: This 60-ton mass of machinery is a "needle valve" built by Westinghouse to help the Friant Dam control the flow of millions of gallons of water to irrigate orchards and vineyards near Fresno, Calif. A 14-ton nozzle is being lowered over the 10-ton cone-shaped needle and onto the 12½-ton body of the unit. NEA photo

Coast Foundries Feeling Slump

SIGNS of trouble are appearing in the West Coast foundry industry.

Operations in a number of California iron, brass, bronze and aluminum foundries have slumped anywhere from 10 to 50 per cent in the last few weeks, and although steel foundries haven't curtailed as yet, many of them expect some slight decline within the next month or two.

Most foundry managers are hopeful the current reductions are temporary, and that business will pick up early in the new year.

Hit By Refinery Strike—They base this view on several reasons. For example, many foundries have been affected severely by the oil refinery and longshoremen's strikes, both of which have just been settled. With normal operations in the refineries and along the waterfront, foundrymen believe orders for new business will start picking up.

As another reason for the slump, foundry operators blame the normal seasonal year-end letdown in business. At this time of the year, they point out, many companies avoid building inventories and withhold new orders until next year.

Most California foundries report sharp reductions in the backlogs of unfilled orders on their books. This decline has hit smaller firms harder than big companies.

In spite of reduced activity, together with an increase in competitive efforts, no signs of price weakness have appeared in the western foundry business. Several foundrymen explained that as long as scrap is high in price and scarce in quantity, prices on castings are unlikely to be reduced.

How's Business?

Industrialists exercising more caution as business prospects dim slightly

SOFT spots are appearing in the economy on an increasing scale. Whether this means the long-predicted postwar leveling off in business is getting under way, however, is uncertain.

Industrialists, nevertheless, are less optimistic with respect to the business outlook than a month or so ago and are exercising more caution in accumulating inventories. Steel appears to be an outstanding exception in this respect with the producers continuing to report demand far in excess of supply. Steelmakers point out that the lighter durable goods now experiencing slower demand account for less than 2 million tons of steel yearly.

Consumer durable and consumer soft goods appear to be chiefly affected to date by the slump, with the signs pointing to supply-demand balance in many items. As pointed out in STEEL (Nov. 22, p. 39) a buyers' market has been attained in a good many lines and with the fading out of shortages buyers' resistance to high prices has increased. Even easing in demand for new automobiles in the higher price brackets is noted.

Not Severe—The letdown in activity is not severe though curtailment in manufacturing has been sufficiently widespread to have caused the laying off of hundreds of workers throughout the country. The gray iron castings industry has experienced a sharp decline in volume of new business. Today it is estimated demand for castings is down about 30 per cent from the peak.

Hoover Lays Off 400 Workers

LAYOFF of 400 production workers at its North Canton, O., vacuum cleaner plant has been disclosed by Hoover Co.

While asserting that field salesmen are still selling two and a half times as many cleaners as before the war, the company acknowledges a reduction in sales in recent months and dwindling order backlog.

Republic Lays Off 300 Men

CONFUSION in stainless steel sales as a result of changes in policies on discounts to warehouses is reported to have contributed substantially to the lay-off of 300 employees at Canton, O., by Republic Steel Corp.

Those laid off had been employed in production of handmill stainless sheets, sold largely through warehouses. Several months ago Republic and several other companies altered their policies concerning discounts on stainless to warehouses. However, some producers made no change. It was reported recently that sales resistance is influencing some of the companies which changed their policies to reconsider the changes.

The lay-off at Canton is in no way connected with production of stainless strip in coils, demand for which continues strong. Those laid off are to be absorbed immediately in other Republic operations at Canton.

Apex Cuts Production Pace

APEX Electrical Mfg. Co., Cleveland, has laid off 300 employees in its plants at Cleveland and Sandusky, O., and has put the plants on a 4-day week. More layoffs are understood to be in prospect at the first of the year.

The company manufactures washing machines, vacuum cleaners, ironers and dishwashers.

Diebold Cuts Employment

DIEBOLD INC., Canton O., manufacturer of office and banking equipment, including vaults and filing systems, has cut its production forces by about 165 over the last 30 to 60 days. The reduction reflects a cut in order backlogs.

Economists Differ on Profits

THE CIO says industry is amassing lush profits now as a cushion against a depression, but by doing so is hastening just such a bust.

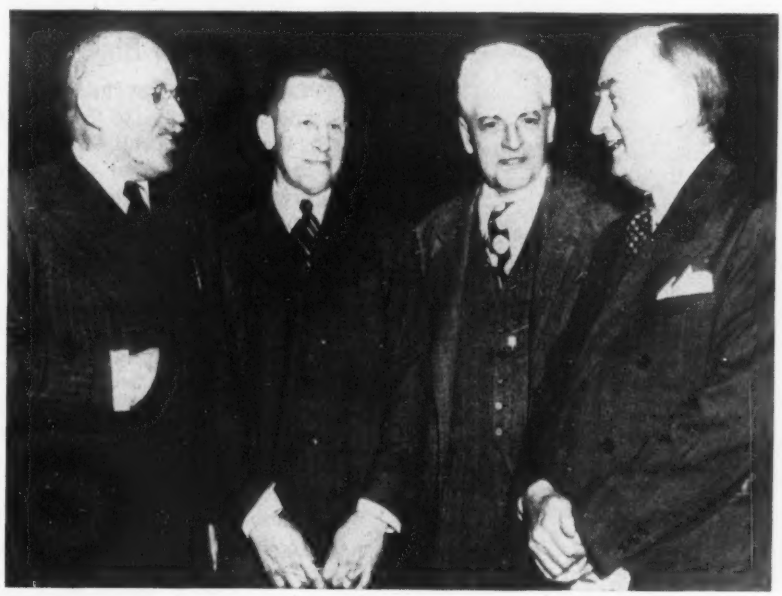
In testimony prepared for the Senate-House Economic Committee's investigation of business earnings, Stanley H. Ruttenberg, CIO research director, asked for a new excess profits tax so "present high levels of speculative profits can be taxed away."

Seymour Harris, Harvard economist, also recommended to the committee a return to the war-time corporate tax level of 60 per cent, instead of the 40 per cent, as a brake on inflation.

However, another Harvard economist, Sumner H. Slichter, declared that corporation profits are not nearly so high as advertised. Corporations, he said, in the last three years have overstated their profits by 16.4 billion dollars in appraising inventories at replacement instead of original cost and in figuring as profits the rising dollar value of plants and equipment.

W. A. Paton, University of Michigan economist, supported Mr. Slichter.

George D. Bailey of Detroit, former president, American Institute of Accountants, agreed that present high profits are partly explained by accounting methods which are based on the prewar dollar value.



Seeking a formula for more general distribution of current large returns to business, a Congressional Joint Economic Subcommittee heard at Washington last week two college professor-economists as witnesses. Left to right are Sen. Ralph E. Flanders (Rep., Vt.); Seymour Harris, economist; Prof. Sumner Slichter, economist; and Sen. Joseph C. O'Mahoney (Dem., Wyo.). NEA photo

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Commerce Secretary Sawyer disappoints business in NAM address by failing to be specific on administration plans for economic controls

THE SPEECH which Secretary of Commerce Charles Sawyer made before the National Association of Manufacturers has been a distinct disappointment to business spokesmen and lobbyists in Washington. This was because he failed to give any assurances on matters with which business men are chiefly concerned at this time—such matters as the confused situation on pricing methods, the outlook as to price and other controls which President Truman will request, plans of the Justice Department for prosecuting monopoly, etc.

The only assurance Mr. Sawyer has given to date has been exceedingly indefinite. Coming out of the White House after getting the President's approval of his NAM speech, he told questioning newspaper men that he saw "nothing to cause any legitimate business to be fearful."

Capital wiseacres are much more impressed with the speeches of Agricultural Secretary Brannan, who keeps harping away on the need for a permanent farm price support program with adequate storage facilities for farm produce, and of Labor Secretary Tobin who not only reiterates the administration view that the Taft-Hartley Act is a vicious law and must be repealed, but who throws in overtones such as that wages have lagged behind prices.

Murray Speech — As a matter of fact, the speech which Philip Murray made to the CIO convention at Portland, Oreg., summarizes quite accurately what President Truman has promised. Murray uttered an 8-point demand for price control, and excess profits tax, inventory controls, an all-out attack against monopoly, a permanent farm price support and farm products storage program, a higher minimum wage, low-cost public housing and an "all-out" program on plant expansion in the basic industries.

The only departures that Mr. Murray made from commitments already made by President Truman is his request for an increase in the minimum wage to a full dollar an hour, and his inclusion of steel with electric power generation in the needed expansion program. President Truman has been asking for a minimum wage of "at least 75 cents or more," and he has committed himself to requesting only an increase in the power program.

Rough Treatment — Capital opinion is that lobbies opposed to the President's program—as reiterated by Mr. Murray—will get rough treatment next year. That includes the drive against "socialized" medicine for which the American Medical Association is raising $3,500,000. With Federal Security Administrator Oscar Ewing as the co-ordinator, a gigantic campaign is being organized to drum up public demand for legislation of the President's public health program. Mr. Ewing stands ready to charge that the doctors charge outrageous fees which cannot be paid by the average citizen, and that the medical profession supervises medical education to the end that a shortage of doctors will continue to be a normal condition.

In another important sector, the Justice Department is said to have plans for launching new monopoly actions on an unprecedented scale and is preparing to make strong demands on Congress for a large appropriation for this purpose.

Getting Ready for Big Show

PEOPLE who do not mind crowds and who would like to know more about Washington will do well to visit the capital city to take in the inauguration of President Truman on Jan. 20. Arrangements are being made to accommodate an influx of some 750,000 from all over the nation, not including the District of Columbia home folks. It should be the biggest occasion of the kind in history, particularly because the depression cast a pall over these events in the '30s and the emergency and war conditions prevented all-out activities in 1941 and 1945.

The dozens of national shrines are being polished up and lecturers will be on hand to explain their significance to visitors. All government departments and agencies will hold open house. Foreign embassies will be thrown open to the public; all Washington will wear its best bib and tucker.

Some 40,000 seats along the line of the inaugural parade are on sale at prices ranging from $2 to $10—the $2 seats are all sold out as of the moment. By express order of President Truman, prices to be charged the public will be as low as possible so as to encourage popular attendance.

Colorful Occasion — The occasion promises to be exceedingly colorful with the parade in six or eight divisions including civilian and military participation. Every day something new is announced; Governor Folsom is coming up with a 200-piece band, a circus owner in Louisville is furnishing an old-style steam calliope, etc.

Where will all the people eat and sleep? The hotels are practically sold out for the three or four days of the inauguration—but householders all over the area are being urged to make rooms and food available. There will be a sleeping car city with hundreds of Pullman cars and diners. Cot beds will be set up in public buildings to take any overflow.

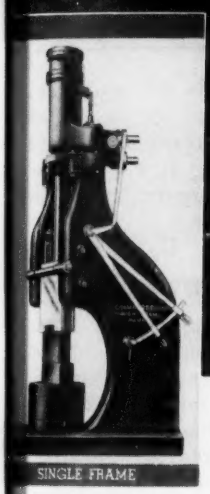
The Inaugural Committee, composed of 64 civic leaders from all walks of life, is rounding out details with hundreds of citizens in daily conferences. The main events, of course, will be the inauguration itself, the inauguration parade, a grand ball and a gala concert—all open to the public. But that is not nearly all. Practically every entertainer of note is to take part in the events. The music had better be good—for no less a figure than James C. Petrillo is to be in charge of this part of the program.

Those who contemplate attending the ceremonies can get information by addressing the Inaugural Committee, located in the Tariff Building at Seventh and E Streets N. W.; the telephone is STerling 1555, and the information extensions are 3447, 3448 and 3449. Better still, they should depend on their local railroad, bus line and airline ticket offices who within a week or so expect to be in a position to sell complete inauguration trips in "one package" which will include everything; details are being worked out by a Transportation Committee headed by Stephen H. Harrington, vice president, Brown & Bigelow Co., Minneapolis.

Directs Programs for NSRB

TO THE important post of director of its Programs Division, the Na-

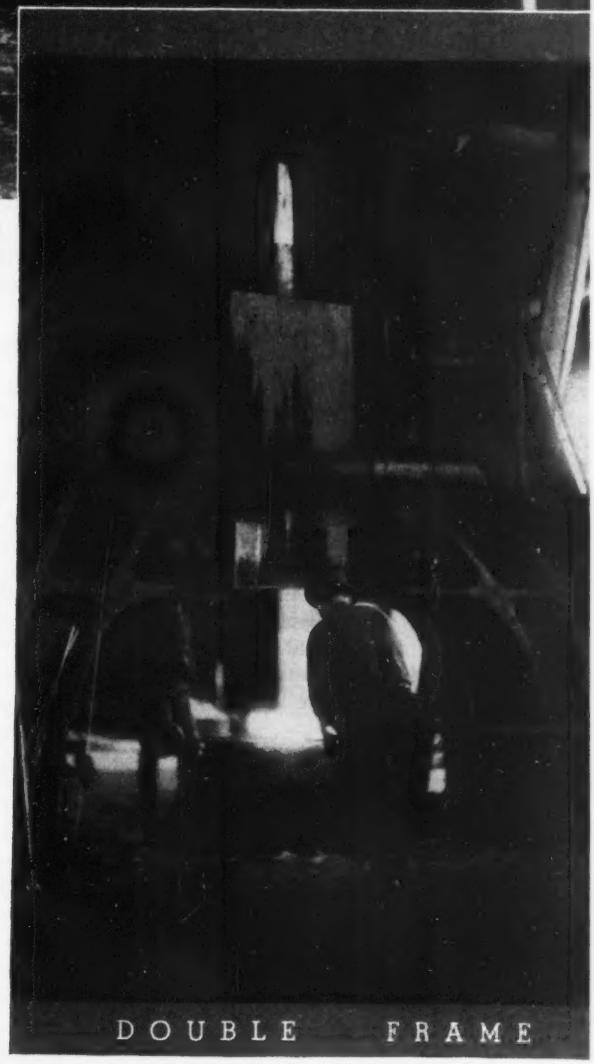
CHAMBERSBURG



SINGLE FRAME

MODEL "L" FLAT DIE FORGING HAMMERS

Greater economy from new automatically lubricated small-bore cylinder and differential valving; more production on heavier anvil. Have you checked on these Model "L" hammers?



DOUBLE FRAME

CHAMBERSBURG ENGINEERING CO. CHAMBERSBURG CHAMBERSBURG, PA.

tional Security Resources Board has appointed Ernest A. Tupper, Washington management consultant. The division has the responsibility of establishing and maintaining a balance in military and civilian requirements and resources in emergency mobilization planning, to the end that all needs would get attention in order of priority. Mr. Tupper was with the War Production Board and prior to that served 10 years in the Department of Commerce. For three years he was vice president of the Gruen Watch Co.

Labor at Home in White House

THESE DAYS more than ever labor union leaders are at home in the White House and when they get an idea as to some activity or other the government should pursue they go direct to President Truman.

An instance of this kind occurred a few days ago when Eric Peterson, general secretary-treasurer, International Association of Machinists, urged President Truman to use his influence to obtain a thoroughgoing investigation of lobbying activities in Washington by a joint congressional committee. The purpose, said Mr. Peterson, is to discourage lobbyists from attempting next year to block the President's legislative program.

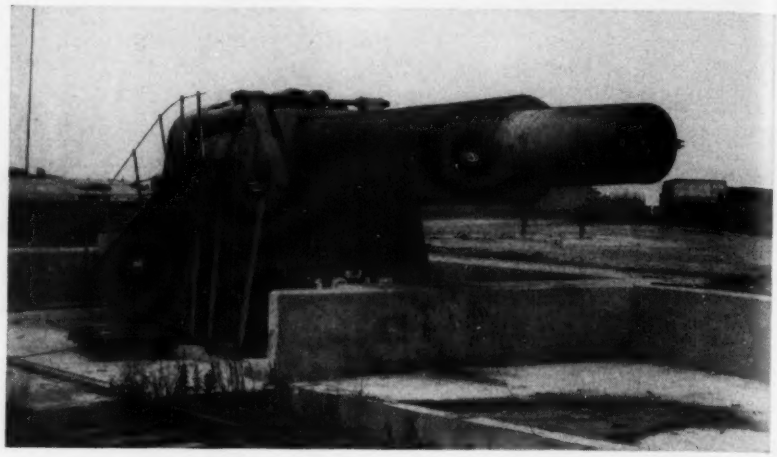
President Truman wrote to Mr. Peterson a letter of thanks and said: "I think your organization has rendered a distinct public service in taking a stand on this matter. While it is up to Congress to determine the subjects which it will investigate, I feel sure that a thorough investigation of lobbying activities would have a very salutary effect."

The matter of lobbying came in for some humorous discussion during President Truman's press conference on Dec. 2 when one of the newsmen asked: "Would you be against lobbyists who were in favor of your proposals?" Well, the President said, smiling, that would be a different matter. They wouldn't be called lobbyists; they would be called citizens appearing in the public interest. The President led the laughter that followed.

Arranging Training Missions

ELLIOTT S. Hanson, now connected with the Economic Cooperation Administration as training consultant, is visiting Denmark, Norway and the United Kingdom to arrange training missions to be sent from those countries to the United States. These will include technicians, and representatives of management and labor; they are to be given courses of training in efficient American plants with the purpose of teaching them the American "know-how" and thus helping to step up productivity in the Marshall Plan countries. Plans already have been discussed for sending to the United States representatives from the Danish shipbuilding, food processing and machine tool industries.

Mr. Hanson resigned as head of the Iron & Steel Division, Office of Domestic Commerce, Department of Commerce, to go with ECA.



24-INCH GUN: Believed the largest gun of its type, this 24-incher fires 2000-lb bombs and guided missile warheads against armor plate and concrete target at supersonic speeds for test purposes at the Naval Proving Ground, Dalgren, Va. The gun basically is a sawed-off barrel of a standard 16-in. gun of the type mounted on battleships of the United States Navy. NEA photo

Ship Subsidy Under Study

WHETHER to allow, on the proposed super liner on which bids were opened Dec. 1, the full permissible subsidy of 50 per cent of the cost price now is in process of determination by the Maritime Commission which hopes to make a decision before Christmas.

When American Export Lines placed two combination boats with the Quincy yard of the Bethlehem Steel Corp. last August, a subsidy of 45 per cent was allowed to cover the excess cost of building in an American yard as compared to a foreign yard. Since August, costs here have been mounting, it is understood, more rapidly than the costs abroad.

The two bids put in on the super liner were $67,350,000 by Newport News Shipbuilding & Dry Dock Co. and $75,649,000 by the Bethlehem Steel Corp. The subsidy does not include a so-called national defense feature payment to be made by the Navy for extra speed; amount of this extra subsidy is not made public. To be operated by the United States Lines, the vessel is to have speed of 28.5 knots. It will have facilities for 2000 passengers and in war for 12,000 troops.

Leaving Secret Service Post

SUCCESSOR to the famous Elmer Irey as chief co-ordinator of the Treasury Department's law enforcement agencies is James L. Maloney who, as head of the Secret Service, has been responsible for protecting the President and for tracking down counterfeiters. The duties of most interest to business which he now undertakes include direction of the intelligence work of the Bureau of Internal Revenue, and the supervision of customs collections, and alcohol tax collections. A native of Binghamton, N. Y., Mr. Maloney has been with Secret Service 19 years. He is succeeded as Secret Service head by U. E. Baughman Jr. who has been supervising agent of the New York district.

Plan Naval Historical Museum

DONATIONS by four manufacturing organizations who are important suppliers to the government have given an auspicious start to the movement to convert a part of the Decatur House property, Washington, into a naval historical museum. The Naval Historical Foundation reports $5000 gifts from the Bethlehem Steel Co., General Electric Co., Newport News Shipbuilding & Dry Dock Co., and the Standard Oil Co. of New Jersey.

Production Climbs in Western Europe

Output gains and capacity expansion programs mark industrial revival in Bizonal Germany, Austria, Belgium, Luxemburg, Great Britain. French picture still spotty

WESTERN European postwar production records are being chalked up in almost every nation, and capital expansion programs in several hold promise for even heavier gains in the future.

Steel ingot and pig iron output in Western Germany climbed to a postwar high during October. Economic Cooperation Administration has approved the use of funds for construction of an Austrian blooming mill. September saw postwar steel production records in that nation. Belgium and Luxemburg again set a steel output record in October. Improvements in Great Britain's supply situation have resulted in distribution control modifications affecting small users of steel and foundries. Only in France is the picture spotty. Turnout of pig iron and steel ingots is falling in that country, but some steel consumers, notably automakers, report production gains.

Western Germany

OCTOBER ingot steel production in the American and British occupation zones rose to 610,300 metric tons, a gain of 7 per cent over the previous month and an annual rate of 7,320,000 tons. Pig iron output, which has risen steadily since March, 1948, jumped another 8 per cent in October to 508,000 metric tons.

These gains came at a time when the French were protesting that the United States and Great Britain permit the Ruhr's economic recovery to progress too fast and too far. The showing in production also prompted communist trade unionists to make new attempts to infilter into Western German trade organizations, efforts which have failed, according to the American Military Government. Communist leaders from Eastern Germany, after having walked out of the ninth interzonal union conference in August, recently attempted to renew relations with Western Germany unionists, who have ignored, however, four consecutive invitations from the communists to resume conferences.

The pinch of the Russian blockade has forced about 400 more Western Berlin firms to close down or reduce operations in the last two weeks, AMG reports.

The excellent steel production has had little effect as yet in lowering demand. Sheets are particularly tight. All plants in the Ruhr which make this product are booked to full capacity for eight to ten months; even longer delivery periods are necessary in the case of special sheets. Production on this item is going down as a result of increasing bottlenecks in power supply.

The production of aluminum is on the increase, since supplies have been nil from the U. S. and Canada. About 1890 tons of primary aluminum were produced in September compared with 1104 tons in July. Production of secondary aluminum has similarly been stepped up to about 1750 tons in September compared with 1430 tons in July.

October production of motor cars reached 8018 units, a new postwar high, four times greater than last year and more than twice the average of the 1948 second quarter. Used car prices are higher than the price for new cars. It takes about a year to get a passenger car or heavy truck, not quite so long for light trucks and commercial vehicles. The industry claims it can use 172,500 tons of steel during the 1949 first quarter. It won't get anything near this amount.

Austria

AMERICAN engineering firms will get machinery orders for the equipping of a new $4.3 million blooming mill approved by Economic Cooperation Administration for Alpine-Montan Gesellschaft, Austria's largest steel company. The mill will be located in Donawitz in the Austrian Alps.

Until recently it had been planned to order the mill installation from German and Swiss firms, but Austrian engineers reported that U. S. manufacturers are able to deliver a superior product from the standpoint of engineering design in less than one-half the time required by European suppliers.

The existing steam-driven blooming mill, installed in 1897, is now obsolete and subject to frequent breakdowns. A production of 30,000 metric tons a month is the maximum obtainable in the present mill. The new, electrically driven unit is designed to produce 40,000 metric tons of blooms and slabs a month in normal operations of two shifts. The mill is also designed to reduce power costs by 65 per cent and labor costs by 16 per cent.

More than 57,000 metric tons of pig iron and over 60,000 tons of raw steel were turned out in September, postwar records. The production of rolled products exceeded 35,000 tons. At the Linz works in Austria there are three 25-ton electric furnaces which turned out 10,500 tons of electric steel in September. A scrap shortage curtailed output here, but conditions are expected to improve. A new sheet mill is soon to begin operations at Linz, to produce at the rate of 400 tons per month.

The Austrian iron and steel industry, as in Western Germany, is being reorganized. A holding company will take over the capital stock of all steel companies. The holding company will be a planning and policy organization, its most immediate problem being to achieve an annual output of 1,070,500 metric tons of steel per year, with the help of the Marshall Plan. The subsidiary companies will retain their independence.

Belgium, Luxemburg

POSTWAR steel production records have again been achieved in Belgium and Luxemburg.

Belgium turned out 366,000 metric tons in October, while in Luxemburg the output was about 240,000 tons. The export demand remains satisfactory and covers a wide range of products, particularly plates, sheets and wire rods. Many inquiries, but not so much business, have come from the U. S.

Belux export prices for the "free" markets—those with which no formal commercial agreement has been concluded—are firm: Merchant bar quotations range from $114 to $125 per metric ton f.o.b. Antwerp, according to specification and country of destination; plates range from $150 to $155; sheets 1.6 to 2 mm are about $160.

Great Britain

IMPROVED steel supply situation has eased government distribution controls in Great Britain.

Firms who use less than 25 tons of steel in each quarter and whose consumption does not include more than 10 tons of steel sheets now need to apply for steel on a yearly basis only. About 30,000 users are affected. The new arrangements do not apply to tinplate, terne plate or black plate. Another simplification involves steel castings which are no longer under

control. Some 2000 foundries producing about 3 million tons of castings a year will benefit. Authorizations will continue to be required for supplies of pig iron, steel and scrap consumed by the foundries.

Metalworking production gains are anticipated from a recent government move to standardize on engineering components. A committee has been formed to advise on any simplifications possible in the components industry.

The steel nationalization bill has received its second reading in the House of Commons, with a government majority of only 162, 373 for and 211 against, which represents one of the largest opposition votes in the history of this Parliament. Before this bill can become an act and part of the nation's legislation, the measure must tread through a thorny path of Commons committees and the House of Lords, a procedure which could take many months if the Lords vote for very many amendments.

France

PRODUCTION of automobiles in France during September was 7218 private cars, compared with 5502 in August; 7260 commercial vehicles were turned out, compared with 5075 in August. The monthly average in 1938 was 15,000 private cars and 3260 commercials.

The strikes caused a further decline in iron and steel output in October. Pig iron production was 402,000 metric tons, steel ingots and castings 443,000 tons. An additional blast furnace has been blown in at the Hagondange works of Union des Consommateurs de Produits Metallurgiques et Industriels. This brings to five the number of active furnaces, and production is now up to prewar level. French pig iron has begun moving to Great Britain.

War damage to French railroads has now been almost completely repaired. A new equipment program is in progress. Two liners have been launched at the yards of Ateliers et Chantiers de la Loir. These ships are 535 ft long and have a displacement of 11,000 tons. They are fitted with two 5000 hp diesel engines.

Czechoslovakia

EXPORTS of iron and steel from Czechoslovakia in September totaled 42,500 metric tons. High production was achieved by Czech works in October, the pig iron output being estimated at 149,000 metric tons compared with 134,000 tons in September. For steel ingots the figures were 231,000 tons in October and 219,000 tons in September. Labor force in the iron, steel and engineering fields now approximates 250,000, compared with 195,700 at the beginning of 1946.

In accordance with recent commercial agreements, Czechoslovakia is to supply rolled products and machinery to Denmark, in exchange for foodstuffs and pharmaceutical products. With Switzerland the nation will exchange iron and steel products for machinery and instruments. The Czechs also report they have a contract to supply equipment for an oil refinery in Brazil.

The Netherlands

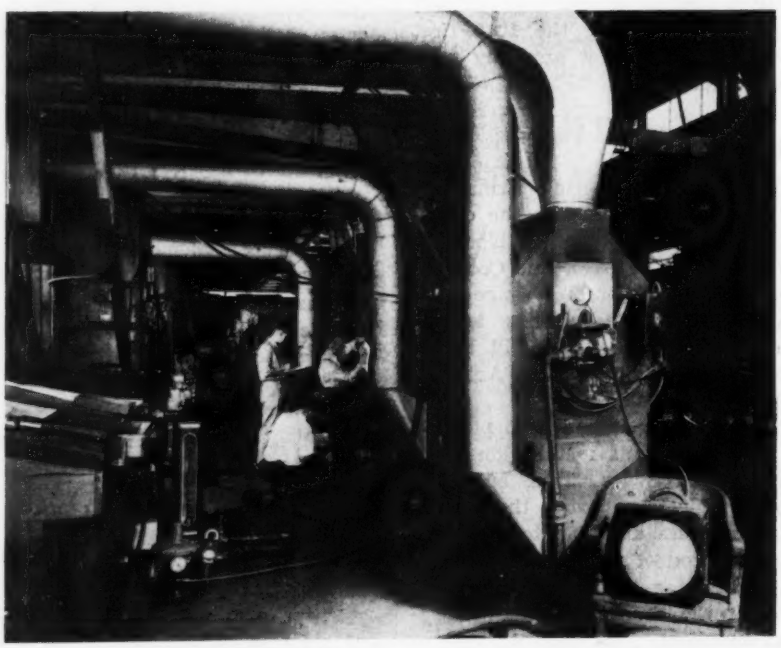
DUTCH exports of pig iron passed all records in August with 30,917 metric tons. For the first eight months of the year, pig iron exports were 191,640 tons, of which 28,098 went to the U. S.

Poland

POLAND is supplying steel ingots to Roumania to be rolled in that country. The finished products will be exported back to Poland. The rolling operations will take place at the Roumanian Hunedoara works which have now been restarted.

Denmark

IMPORTS of iron and steel products into Denmark during the first three quarters of 1948 were as follows: First quarter 73,950 metric tons, second quarter 97,488 tons, third quarter 70,473 tons. These imports came mostly from Belgium and Luxemburg, Great Britain and the U. S.



ACCELERATED TEST: Gas-fired warm air space heater shown in foreground has just completed the equivalent of 14 years of operation during test at the heater research laboratory of Dravo Corp., Pittsburgh. Heater is equipped with a stainless steel combustion chamber. After being cycled more than 112,000 times, equal to the heater starting and stopping 40 times daily during fourteen 200-day heating seasons, the chamber showed no deterioration from oxidation or other causes

Treatise on Radar Available

THE FIRST all-out treatise on one of the principal secret weapons in World War II is contained in a 1300-page book "History of Radar" just published by John C. Green's Office of Technical Services. The work was prepared under the direction of Prof. Henry E. Guerlac, now with Cornell University.

Originally conceived as a non-public document, it contains information heretofore classified as secret; it was freed from security restrictions because of the industrial values of radar.

The manuscript is available for free inspection at the Library of Congress, Government Publication Room. The book is in four parts which may be purchased from the Library at $166.25 in photostat form and at $31.50 in microfilm.

Cost Conscious Industry

Cleveland survey shows manufacturers are going all-out to fight output cost jumps

IMPROVED production machinery, efficient application of cost controls, a drive for quality in products and a call for all-out effort on the part of employees are the weapons management is using to combat a steadily rising break-even point in manufacturing, Associated Industries of Cleveland has learned from a survey it conducted among 103 manufacturing firms in the Cleveland area.

More than 90 per cent of the companies surveyed reported they have installed more efficient production machinery since the war's end. About 8 per cent of these said they have completely retooled within the past year, and that this has enabled them in some instances to step up manufacture of their products as much as 30 per cent.

Cost Conscious—Manufacturers are keeping a weather eye on inventories and have instituted programs for both supervisors and employees to make them more cost conscious, the survey showed. Concentrated efforts are being made to reduce scrap, and incentive and bonus plans are common as a reward for employees who contribute to increased output. In regard to substitute materials, most manufacturers are over the hump, but in some cases substitutes have been found to be cheaper and as satisfactory or more so than the original materials.

Human relations are being emphasized as an aid to production. One company said it gained amazing results by appealing directly to the union; standards were set, and when the worker's performance was below par the union itself took a hand in the matter. A twice yearly "reduce the cost" contest reported by another firm has had excellent results.

Raw Materials Easier To Get—A greater availability of raw materials has eased the warehousing problem. Companies using steel are in a few instances expanding warehouse facilities, but these firms are in the minority.

A great deal of attention is being paid to non-productive overhead, and Associated Industries survey found that companies are considering streamlining their organizations.

Rensselaer Surveys Industry

AMERICAN industry foresees a steadily increasing demand for engineering specialists. It expects the colleges to continue to supply engineers of increasingy broader competence. It is willing, for the most part, to help meet the increased costs which such a program of education puts upon the colleges of engineering.

These are the salient views expressed by 550 representative industrialists in an analysis by Rensselaer Polytechnic Institute, Troy, N. Y. Highlights of the study are:

Seventy-six out of each 100 of the executives think the demand for engineering specialists will continue to increase during the next 10 years. The remainder see no slackening in the need. Seventy-eight of each 100 of the industrialists say the colleges should raise the level of faculty salaries as a major step in supplying engineers of broader competence. Sixty-five of each 100 think that industry and business, through outright grants or by special research projects, should help the colleges of engineering carry the heavier cost burden which this program entails.

Harvester Sees Production Clouds

SEVERAL threats to continued high level of operations at International Harvester Co. exist, according to John L. McCaffrey, president, and Fowler McCormick, chairman, in a quarterly review of the firm's operations.

"Current experience indicates an increasingly competitive situation on several lines of our products, with growing activity and price consciousness on the part of many buyers. At present this is particularly true of motor trucks, power units and dairy equipment, and we believe the trend may be extended to other products," they reported.

Materials procurement is tougher than at anytime since the war, they said, and the outlook is now so uncertain that the company has not been able to schedule some increases in production which were previously planned.

Inventories of the company are higher than a year ago due to rising dollar values rather than increases in physical inventory. In the past two quarters, 95 per cent of materials and supplies used by Harvester have risen in price.

Sales of the company for the fiscal year ended Oct. 31 were estimated at $944 million, or 27 per cent higher than last year's record sales.

Western Metal Show Lineup Set

FINAL committee appointments for the Western Metal Congress and Exposition to be held April 11-15 in Los Angeles have been made, according to W. H. Eisenman, national secretary, American Society for Metals, and managing director of the event.

The general committee, having the responsibility of directing overall policy of the exposition, is headed by E. R. Babylon, Kaiser Co. Two vice chairmen on this committee are James B. Morey, International Nickel Co., and S. R. Kallenbaugh, Timken Roller Bearing Co.

California Commerce Men Meet

CALIFORNIA State Chamber of Commerce recently held its 21st annual meeting on agriculture and industry at the Palace Hotel, San Francisco.

Included on the agenda of the meeting were conferences on industry, highways, taxation, social security, water resources and transportation. Highlighting the industrial conferences were discussions on the impact of the recent shipping strike, relations of business with Congress and the state legislature, labor-management relations, etc.

Calendar of Meetings . . .

Dec. 14, Navy Industrial Association and Bureau of Supplies and Accounts: Materials handling and packaging conference, Navy Supply Center, Oakland, Calif.

Jan. 4, American Washer & Ironer Manufacturers' Association: Annual meeting, Morrison Hotel, Chicago.

Jan. 10-14, Materials Handling Institute and American Society of Mechanical Engineers: Materials handling show, in Philadelphia. ASME's management and materials handling divisions will conduct a five-day materials handling conference concurrently with the exposition.

Jan. 16-20, Associated Equipment Distributors: 30th annual meeting, Hotel Stevens, Chicago. Group's executive office is at 360 N. Michigan Ave., Chicago.

Jan. 20-22, Society for the Advancement of Management: Conference on industrial mobilization, Chicago. Society headquarters are at 82 W. Washington Blvd., Chicago.

Jan. 24-28, American Society of Heating & Ventilating Engineers: Ninth international heating, ventilating and air conditioning exposition, International Amphitheatre, Chicago.

Jan. 27, Stoker Manufacturers Association: General meeting, LaSalle Hotel, Chicago. Association headquarters are at 307 N. Michigan Ave., Chicago.

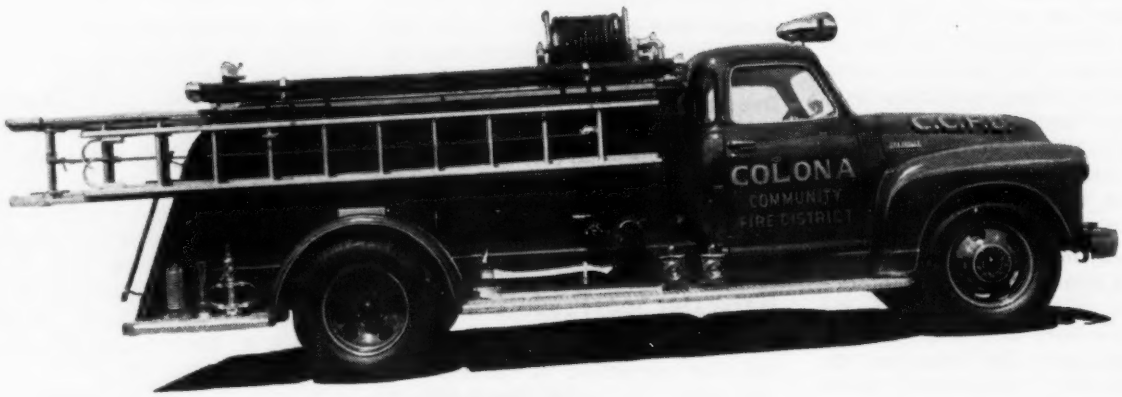
Feb. 13-17, American Institute of Mining & Metallurgical Engineers: General meeting, San Francisco.

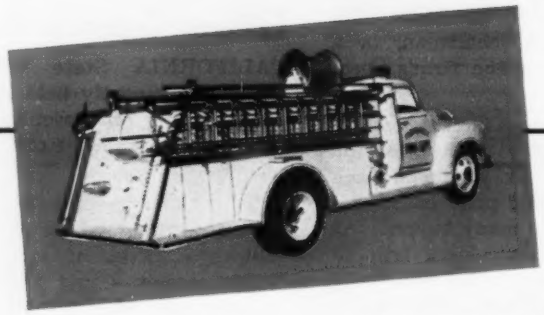
Feb. 21-22, Purdue University and Material Handling Institute: Materials handling conference on Purdue campus, Lafayette, Ind.

Feb. 28-Mar. 4, American Society for Testing Materials: Spring meeting and committee week, Hotel Edgewater Beach, Chicago. Society headquarters are at 1916 Race St., Philadelphia.

"INCREASED EFFICIENCY...DECREASED COSTS WITH N-A-X HIGH-TENSILE STEEL"

Fire Fighter Truck Company, Rock Island, Illinois





Here is what the Fire Fighter Truck Company of Rock Island, Illinois has to say about N-A-X HIGH-TENSILE steel.

"In the use of this steel, we have increased the efficiency of our fire trucks and at the same time decreased our construction costs. We are now permitted to increase the hose carrying capacity using the same gauges as we formerly did with plain hot rolled sheet steel.

"The added strength of N-A-X HIGH-TENSILE permits us to install booster tanks of larger gallonage. The corrosion-resistant properties of the steel has shown to good advantage in that longer life is noted in our booster tank.

"We have found that in applying paint to this steel we can secure a better and longer lasting bond due to its impact- and abrasion-resistant qualities. These same qualities reduce shop imperfections from abrasion and impact, thus reducing surface refinishing prior to painting."

The high physical properties of N-A-X HIGH-TENSILE steel can help *you* increase your production . . . improve your product . . . reduce your fabricating costs.

MAKE A TON OF SHEET STEEL GO FARTHER
Specify—
N-A-X
HIGH-TENSILE STEEL

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N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
UNIT OF NATIONAL STEEL CORPORATION

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

General Motors plans to display its line of products in New York, Jan. 20-27. May outdo Ford spectacle put on last June. Show seen index of present, future trends in transportation

DETROIT

"TRANSPORTATION Unlimited" will be the theme of the General Motors' showing of its line of products at the Waldorf-Astoria in New York, Jan. 20-27. Already a number of specially fitted models are being readied for display which, in addition to automobiles, will feature aviation jet engines, along with diesel marine, railway, truck and coach developments.

The showing is calculated to be not only an index of the present but also a keynote of future trends in air, highway and railroad motive power.

Typical of the latest in automotive power plants will be the high-compression engine now used by Cadillac and Oldsmobile, and in the transmission field the torque converter drive will be featured. All other products of the corporation will be arrayed against a colorful and dramatic background in the grand ballroom of the hotel, and in adjoining rooms will be exhibits of the allied arts, sciences and manufacturing techniques which blend into the transportation field.

These will include the overall GM facilities which guide and assist various production divisions—research, engineering and styling. Their roles will be shown with animated displays, in some instances artists and technicians being at work just as in everyday operations.

It will be recalled that last June Ford Motor Co. staged a super-extravaganza at the Waldorf in connection with announcement of its new models, spending several hundred thousand dollars on the affair. General Motors is getting set to outdo the Ford showing and is going all-out to present a real spectacle. Plans are under way to have the corporation's "Train of Tomorrow" make a special run from Detroit to New York, taking a large group from the motor capital to visit the exhibit.

The 1949 Pontiac line of models was being inspected by dealer groups and suppliers at the plant last week, and will be unveiled for the press this week. Chevrolet's new models will go into production Dec. 20, assembly operations at Flint having terminated Dec. 1, with inventory and changeover scheduled to be completed by this week. Manufacturing operations will close Dec. 16 for about one week, idling 11,000 for periods varying from two to seven days.

Kaiser Purchases Willow Run

NEGOTIATIONS converting the Kaiser-Frazer Corp.'s lease of the Willow Run, Mich., manufacturing plant into a purchase were completed Dec. 3, with the company buying the war-built bomber plant for $15,100,000. The purchase involves approximately 320 acres of land and 35 buildings with total manufacturing and office space of more than 4,500,000 square feet. The principal structure has a total of 85 acres of floor space, being the only plant in the U. S. in which complete automobiles are manufactured on one floor under one roof. K-F has invested better than $3 million in new buildings and additions in the past two years. Terms of the purchase call for an immediate initial payment of 10 per cent and the balance payable in 20 equal annual installments beginning Dec. 1, 1949.

Since June, 1946, K-F has produced more than 325,000 cars in the plant, currently building about 18,000 monthly. The plant was designed by the late Albert Kahn and was completed in 1942, being operated by Ford Motor Co. for the production of B-24 liberator bombers. A total of 8685 airplanes came from Willow Run.

The original K-F lease included the main manufacturing building, administration and personnel buildings, commissary, power house and other structures covering nearly four million square feet. Subsequently the company added the wartime "spare parts" building, covering 470,000 square feet, to the lease for an experimental engineering parts and service center. Other additions included the construction of a third floor to the original two-story administration building and a new two-story engineering building, now nearing completion.

K-F also acquired Willow Run chapel, a hydro plant and an industrial training building through the purchase of 40 acres of property adjoining the plant in June, 1946. The training building was rebuilt and converted to a retail driveaway building. The corporation also has a 720-acre housing project adjacent to the plant.

The huge airport at the rear of the plant is now the Detroit terminal for the principal airlines serving the city, and adjoining this field are a number of smaller buildings now owned by the University of Michigan.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1948	1947
January	422,236	366,207†
February	399,471	393,636†
March	519,154	443,588
April	462,323	445,138†
May	359,996	404,190†
June	454,401	421,466
July	489,736	400,944†
August	478,146	364,958†
September	437,181	444,500†
October	516,843	461,536
November	494,700*	417,492†
11 mos.	5,034,000*	4,563,655
December		492,819†
12 mos.		5,056,474†

* Preliminary.
† Revised by Automobile Mfrs. Assn.

Estimate for week ended:

	1948	1947
Nov. 20	120,592	115,197
Nov. 27	90,039	84,391
Dec. 4	125,156	110,759
Dec. 11	122,000	117,902

Estimated by Ward's Automotive Reports

GM To Introduce "A" Body Series

FIRST appearance of the General Motors "A" body series was on the series 76 Oldsmobile for 1949. Later it will be seen on both Chevrolet and Pontiac. It follows the pattern set by the larger "C" body, with emphasis on increased glass area. Curved windshield, for example, has 28.5 per cent more area. Its curve is scientifically plotted, according to the Fisher Body Division, so that the driver's line of vision passes through the glass at approximately the same an-

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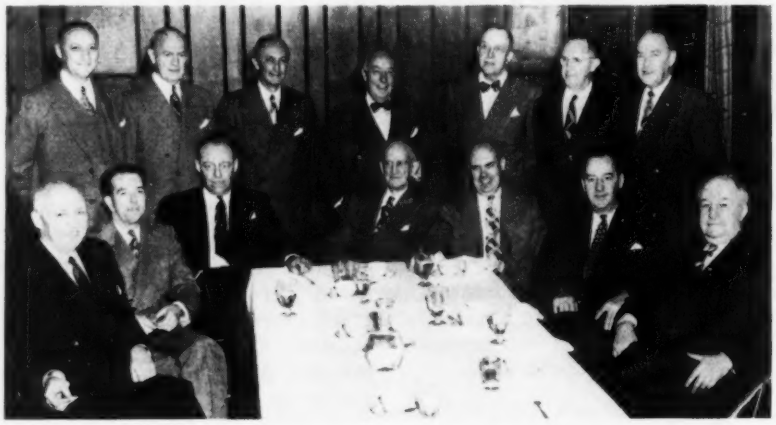


REUNION: Fourteen of the 18 parts industry executives who during the war constituted the Automotive Parts Industry Advisory Committee for both the War Production Board and the Ofifce of Price Administration held a reunion in Detroit recently. Seated, left to right, are: Karl Ammerman, Borg-Warner Corp.; James Coolidge, Thompson Products Inc.; Clarence Skinner, Automotive & Aviation Parts Manufacturers Inc., and secretary of the committee; C. C. Carlton, Motor Wheel Corp.; George Crimmins, Ford Motor Co.; Richard Koch, International Harvester Co.; John Anderson, Anderson Co.; and standing, left to right, Frederick C. Bahr, vice president, Chrysler Motors Parts Corp.; Edgar Hamilton, Automotive Gear Works; J. D. Eby, Wagner Electric Co.; M. D. Douglas, General Motors Truck & Coach Division; Arthur Drefs, McQuay-Norris Mfg. Co.; Max Miller, General Motors Truck & Coach, and George Souther, Electric Auto-Lite Co. Unable to attend were: Burke Patterson, formerly of Thompson Products and now a Chrysler Airtemp distributor in Arizona; Freeman Allen, White Motor Co.; W. E. Schirmer, Clark Equipment Co., and Neil Moore, Federal Mogul Corp.

gle at either end as it does straight ahead. Front pillars of the body are set back appreciably, moving farther from the normal driving-vision range, and they have been made considerably slimmer as well, with their narrowest profile in line with the driver's vision. Glass area in the rear window has been increased by 54 per cent.

Leg room for rear seat passengers has been increased nearly 2 inches by the development of a new type of spring for the front seat. Instead of the conventional coil-type spring, a zig-zag construction is used. Another innovation is the use of push-button-type outside door handles, made necessary by the bulge in the body side directly below the handle line. Size of the luggage compartment lid opening has been increased and the lid is equipped with a new type of spring-loaded hinge which has a combination counterbalancing and hold-open function. The compartment lid also is equipped with a new toggle-action, slam type lock. When the lid is closed it is automatically locked. When the key is turned, the locking bolt is disengaged and the handle serves merely as a grip with which to lift the lid.

There are two types of four-door sedan in the "A" body series, one a streamlined or so-called "fast back" type and the other a "notched back" design. In the larger "C" body series, the streamlined back is used on the two-door, and the notched-back on the four-door sedans. A five-passenger coupe also is included in the "A" body, a style not available in the "C" body.

Novel feature of the new Olds models is the incorporation of air intake louvers into the front fenders, just below the headlamps. These openings balance off the predominant horizontal lines and provide an additional flow of air for ventilation. Parking lights are integrated in the lower part of the louvers.

Packard Sets New Postwar Mark

PACKARD set a new postwar production record in November, turning out a total of 11,124 units and increasing its output for the first 11 months of the year to 86,991. Previous high month for the year was October when 10,547 units were built. Steady gains in production throughout the year attest to the improvement in flow of materials, particularly steel, and it is expected that the year will be concluded with the second-highest production figure in the history of the company. All-time production peak was achieved in 1937 when 109,518 units were built.

Packard, incidentally, has set up what it calls a "university" for its 120 district managers at St. Clair, Mich., 50 miles northeast of Detroit, where factory executives, with the aid of modern visual training materials are schooling district representatives in all phases of automobile manufacturing and selling.

Soft Spots in New Car Demand

PERCEPTIBLE softening of new car demand is noted in scattered areas throughout the country. It appears to be concentrated in the higher-priced models of the independent manufacturers. Delivery of the Ford-Chevrolet-Plymouth cars still is slow, but many instances are cited of immediate deliveries of Hudson, Packard, Kaiser-Frazer and Studebaker models. Weakening of the market has not progressed to the point where any serious concern is being expressed. It is more a matter of buyers becoming a little more choosy and dealers finally being forced to exert some sales effort. There has also been some slowing in models which are now being changed over to 1949 types.

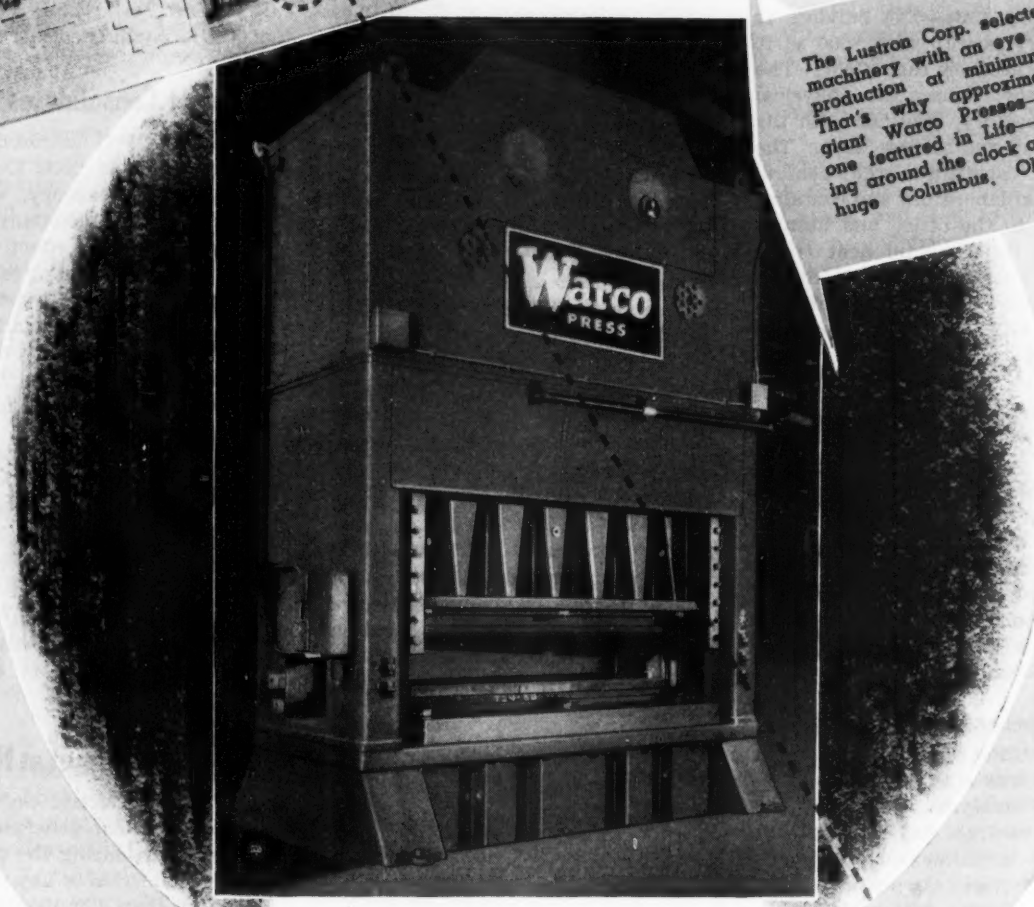
Hudson has announced plans to ship 50 per cent of its cars minus all accessories except bumper guards and heaters. The move was designed to counteract reports of buyers being "forced" by dealers to take many unwanted accessories. While many accessories are factory-installed, it has been the position of the industry that such installations are made only at the specific request of the customer. Ford points out that about 37 per cent of its new cars are factory-equipped with radio, 57 per cent with heaters and less than 20 per cent with overdrive, and the supply of these accessories is "considerably below" requirements.

Freeze-Proof Door

K-F engineers recently completed a novel freeze test on the pull-type door handles. A wood box was fitted over the right front door handle of a Kaiser sedan and in it were packed 25 pounds of dry ice. Then once an hour for six hours water was pumped over the lock and handle where it quickly froze solid. When the box was removed, the leverage action of the handle opened the door easily, shearing away the ice accumulation. The lock mechanism still functioned despite the "quick freeze."

Warco Presses Can't be Beat where Economical Production is Essential

Warco Presses are designed and built by specialists with years of press experience. They are manufactured under facilities recognized throughout the industry as being the finest in the nation. These are reasons why Warco Presses set the pace where economical maintenance-free press operation is required.



The Lustron Corp. selected their machinery with an eye to mass production at minimum costs. That's why approximately 80 giant Warco Presses—like the one featured in Life—are working around the clock at Lustron's huge Columbus, Ohio, plant.

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New Lab for Carpenter

Steel firm's new building gives four times more space for research and development

CARPENTER Steel Co., Reading, Pa., has opened a new laboratory building with a floor area approximately four times that of its old research quarters.

The building is constructed to allow for future expansion and to permit interior changes in the light of new needs and conditions. In the main rectangle of the new structure the only permanent walls are the outer ones. Interior partitions are constructed to permit shifts or additions without affecting the building as a whole.

Three-Story Unit—The building is a three-story facility with 8000 sq ft of working area on each floor. The ground floor houses the physical testing laboratory, together with the machine shop and storage area. The first floor constitutes the general metallurgical laboratory and contains, in addition to the office and library, a complete experimental heat treating room, microscopes, dark rooms, magnetic and expansion laboratories. The chemical laboratory is located on the second floor.

Carpenter's research and development department got its start in about 1893 when a chemical control laboratory was established whose main purpose then was to make final analyses for the melting department. This unit expanded rapidly in the closing years of the nineteenth century, playing its role in the development of some of the first chrome-nickel steels. During this period a physical testing laboratory was also established. A metallurgical unit came into being about 1907.

By this time the function of the laboratory was also expanded to include mill analyses, customer service and research and development. Assisted in large measure by its research activities, Carpenter during World War I was able to be active in the manufacture of stainless steel, gun barrel steels and the myriad alloys needed by the armed services. After the war Carpenter pioneered in the development of free machining stainless steels and improved tool steels.

Complete machine shop in Carpenter Steel's new research laboratory accurately prepares specimens on which a wide variety of tests are made

Indianapolis Mill Sold Again

ALL outstanding capital shares of Whitney Steel Corp., Indianapolis, sheet rolling mill which was owned until last June 30, by Kaiser-Frazer Corp., have been purchased for an undisclosed cash sum by Royal Industrial Corp., New York, from interests associated with David E. Bright and Arnold H. Maremont of Chicago, it has been announced by Jennis M. Doroshaw, Royal Industrial president.

Whitney Steel's products include rolled, pickled and oiled steel sheets, as well as galvanized steel sheets. Its plants, with a capacity approximating 75,000 tons annually, cover a 47-acre tract in Indianapolis. Modernized in recent years, the mills were built originally in 1921 by the Chapman-Price Steel Co. which, in 1927, became part of the then newly formed Continental Steel Corp. of Kokomo, Ind., by which they were operated until the sale to Kaiser-Frazer late in 1947.

Mr. Doroshaw, also president of Doroshaw Corp. of New York, announced that he has assumed the presidency of Whitney Steel, but that no change in either plant personnel or operating policy is contemplated under the new ownership.

Adamas Carbide Moves Plant

ADAMAS Carbide Corp., formerly of Long Island City, N. Y., has moved to a plant at Harrison, N. J., which is four times larger than its previous quarters.

The expanding volume of business done by Adamas, producer of standard and special tool tips, dies and wear parts, made the move necessary. Included among the features at this plant are controlled temperature and humidity in powder and press rooms, more and larger presses for automatically pelleting standard shapes and pressing specials, new furnaces with electrical and optical temperature controls and other equipment for maintaining quality control.

The Adamas business office formerly in New York will also be located at 1000 S. Fourth St., Harrison.

Carnegie Consolidates Ohio Units

YOUNGSTOWN district operations of Carnegie-Illinois Steel Corp., a U. S. Steel Corp. subsidiary, will be consolidated at the company's Ohio and McDonald Works, effective Jan. 1.

Primary move involves transfer of production from the Upper Union Mills to McDonald where additional facilities have been provided to make this tonnage. Employees at Upper Union are being transferred to the other two plants.

Operations on three of the five rolling units at Upper Union have already been discontinued. The two remaining mills are now working only one turn per day. The closing down of Upper Union is part of the company's modernization plan to strengthen the competitive position of Carnegie-Illinois in the Youngstown district.

GE Turbine Output at New Record

GENERAL Electric Co.'s production of large turbine-generators for electric utilities during the past year exceeds production of any previous year by more than 1 million kw.

In making the announcement, J. W. Belanger, manager of GE's turbine divisions, said that by the year's end 11 more units will have been manufactured than in any other peacetime year in the company's history. In all, 65 units with a total generating capacity of about 2,932,000 kw—an average of about 45,000 kw per unit—will have been produced by Jan. 1 in the Schenectady, N. Y., plant. This more than doubles, in capacity, the plant's 1947 production of 1,200,000 kw, when 34 units averaging 35,300 kw were turned out.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

General Electric Co., Schenectady, N. Y., reports 76,000 of its employees, or 44 per cent, are participating in the GE employee savings and stock bonus plan. The plan provides that employees who subscribe for the purchase of U. S. savings bonds are eligible for payment by the company of a 15 per cent bonus of GE stock on the cost price of bonds purchased.

—o—

Weirton Steel Co., Weirton, W. Va., will establish a sales office in St. Louis on Jan. 1, following expiration of an agreement with E. R. Hensel Co. which had represented Weirton. E. F. Conroy will be district sales manager. H. L. Goodwin and J. M. Lawrence will be associated with him.

—o—

Bituminous Coal Research Inc., Pittsburgh, research agency for the bituminous coal industry, has authorized a research budget of more than $500,000 in 1949.

—o—

Westinghouse Electric Corp., Pittsburgh, has begun operations at a new manufacturing and repair plant at Hillside, N. J. The new plant replaces the Haynes Avenue facility in Newark.

—o—

Ohio Edison Co. reports that the threat of an electric power shortage in the Youngstown area is being eased. A 40,000 kw generator at the Akron Gorge plant and a 25,000 kw unit at the Mad river plant in Springfield are coming in this month. The shortage will be eased still further next August when the first new unit at the Toronto, O., plant goes into operation.

—o—

Hammond Machinery Builders Inc., Kalamazoo, Mich., maker of grinding, polishing and printing machinery, has opened a sales office at 1021 E. Eighth St., Los Angeles. E. C. Hammett is western representative.

—o—

Chain Belt Co., Milwaukee, maker of power transmission and conveyor equipment and many other products, has opened an Atlanta warehouse at 878 Ashby St. N. W. The Atlanta district office will be at the same address under direction of J. S. Moore. Warehouse manager is G. J. Schuelke.

—o—

Office of Technical Services has issued a booklet describing a relatively inexpensive air conditioning system suitable in certain parts of the country for intermittent use. System was developed by the University of Texas under a research contract from OTS.

—o—

J. K. Smit & Sons Inc., New York, manufacturer of diamond boring tools, diamond dressers and related products, has completed a new plant in Murray Hill, N. J. The first moves began last month and the firm hopes to complete the entire transfer by Feb. 15.

—o—

American Chemical Society announces the establishment of two new $1000 prizes for achievements in petroleum chemistry and in the field of flavor and perfume oils. The petroleum prize was founded by Precision Scientific Co., Chicago, and the essential oil prize was established by Fritzche Brothers Inc., New York.

—o—

Gerity-Michigan Corp., Adrian, Mich., has secured exclusive sales rights for the Dishmaster, a kitchen sink fixture for dishwashing. Gerity-Michigan for some time has been manufacturing parts for the device, which is assembled by Dishmaster Corp.

—o—

Worthington Pump & Machinery Corp., Harrison, N. J., manufacturer of power plant equipment, turbines and many other products, announces that the manufacturing and distributing activities of its subsidiary, Ransome Machinery Co., are now being conducted by the parent corporation. Production of the lines previously made by Ransome will be carried on at Worthington's Dunellen Works, Dunellen, N. J., the same location formerly used by Ransome.

—o—

Torrington Co., Torrington, Conn., and South Bend, Ind., has appointed Colorado Bearing Co., Denver, as a distributor of anti-friction bearings in Colorado, southeast Wyoming and western Nebraska; Bearing Engineering & Sales Co., Salt Lake City, Utah, as a distributor in Utah, Nevada, southern Idaho and southwest Wyoming; and Bearing Service Co., Waterloo, Iowa, as a distributor in northeastern Iowa.

—o—

J. W. Dice & Co. has been formed at Grand View-on-Hudson, N. Y., to specialize in the marketing of industrial and laboratory non-destructive test instruments by James W. Dice, formerly with Westinghouse and more recently assistant sales manager of Sperry Products.

—o—

Chicago Association of Commerce & Industry reports that value of new construction and lease or purchase of plant sites in the six counties comprising the Chicago industrial area was $15,907,000 in November, compared with the November, 1947, total of $16,057,000.

—o—

Sam Tour & Co. Inc., New York, has been certified by the U. S. Air Force to perform radiography of material to be used in conjunction with contracts of the air forces and Bureau of Aeronautics.

—o—

DeVilbiss Co., Toledo, O., is including several one-week courses for industrial finishers in its School of Spray Painting curriculum. Identical courses will begin on Jan. 10, Feb. 21, March 7, May 2 and June 20.

—o—

American Cladmetals Co., Carnegie, Pa., has appointed Hugh Russel & Sons Ltd., Toronto and Montreal, as a distributor of Rosslyn Metal in Canada and Bell Sales Co., Milwaukee, as a distributor in Wisconsin.

—o—

Continental Copper & Steel Industries Inc., New York, is the new name for Continental-United Industries Co. Inc. and American Steel & Copper Industries Inc. which have merged. E. G. Jarvis is president of the consolidated firm.

—o—

Koppers Co. Inc., Pittsburgh, reports that its Metal Products Division at Baltimore has received a $1,237,000 contract from U. S. Army Engineers for 26 gates sheathed in stainless steel for the Conemaugh river dam in western Pennsylvania.

—o—

Hydro-Line Mfg. Co., Rockford, Ill., manufacturer of air and hydraulic cylinders and special machinery, has appointed C. M. Murray Ltd., Toronto, Ont., as its representative in Quebec and Ontario.

—o—

Tabor Mfg. Co., Philadelphia, maker of foundry molding machines, foundry equipment and other products, has appointed Pacific Graphite Co. Inc., Oakland, Calif., as a sales representative in California north of Fresno.

—o—

Tri-City Steel & Supply Co., Moline Ill., has been sold to United States Steel Supply Co., a U. S. Steel Corp. subsidiary. New owner will continue operation of the warehouse and will retain all employees to service local orders from Moline stocks. Carl R. Hesler was the former owner of the firm.

The Business Trend

RECOVERING from the Thanksgiving Holiday slowdown, industrial production in the week ended Dec. 4 climbed sharply and registered a preliminary 179 per cent of the 1936-1939 average on STEEL's index. The latest figure, which equals the postwar high, represents an increase of 17 points over the preceding week.

AUTOMOBILES—One of the biggest factors in the return to a high level of industrial activity was the production of 125,156 passenger cars and trucks in the week ended Dec. 4. This mark, a new postwar weekly record, represented a gain of 35,674 units over the preceding week. The industry's output since Jan. 1 reached 5,106,648 vehicles at the end of the latest week reported, topping the total for all of 1947 and placing the all-time record of 5,621,715 vehicles set in 1929 within striking distance.

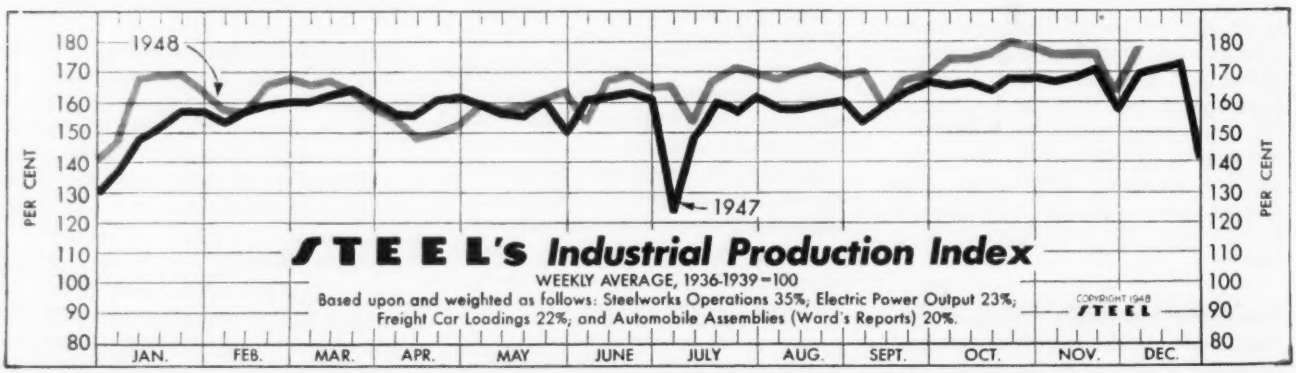
STEEL—The nation's steelmakers continued in the production forefront by advancing their output of steel for ingots and castings to 100 per cent of capacity in the week ended Dec. 4. Production for the week was at an all-time high of 1,804,300 net tons of ingots and castings and erased the previous mark of 1,791,700 tons established in the week ended Nov. 13.

CONSTRUCTION—Still another record was set during the week ended Dec. 2, this one a peacetime record of $362.3 million in civil engineering construction volume in the continental United States. This volume is 221 per cent above the previous four-week moving average and 69 per cent above the corresponding five-day week of last year. November's volume, however, at $451.1 million was 30 per cent less than that for October and 5 per cent below the corresponding month last year.

RAILROADS—Domestic freight car deliveries during November totaled 9286 compared with October deliveries of 8934, according to American Railway Car Institute. Deliveries during the first eleven months of this year totaled 102,370, almost 75 per cent above the same period last year. Production on the leading types of cars was: Box, 2242; hopper, 3394; gondola, 1934; refrigerator, 826. New car orders during November totaled 4852 of which 3277 went to car builders and 1575 are to be built in railroad shops.

SALES—Manufacturers' sales reached $18.9 billion in October, an increase of $150 million above September, but a slight drop in the daily average of sales because of one more working day in October, according to the Department of Commerce. Preliminary returns indicate that all of the October increase was attributable to the durable goods industries, with sales for that group advancing to $7.8 billion, an increase of nearly $200 million over the preceding month. Within the durable group, iron and steel and the automobile industries showed significant gains.

COAL—Stocks of bituminous coal and lignite on Nov. 1 were at the highest level of the postwar period, industries and retail dealers having on hand 68,954,000 net tons, 2 per cent more than the record of a month earlier, according to the Bureau of Mines.



Index (chart above): Week ended Dec. 4 (preliminary) 179 Previous Week 162 Month Ago 175 Year Ago 169

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	100.0	99.0	99.0	97.5
Electric Power Distributed (million kilowatt hours)	5,646	5,349	5,564	5,218
Bituminous Coal Production (daily av.—1000 tons)	1,665	2,045	2,042	2,008
Petroleum Production (daily av.—1000 bbl.)	5,615	5,617	5,627	5,265
Construction Volume (ENR—Unit $1,000,000)	$362.3	$80.8	$109.3	$214.0
Automobile and Truck Output (Ward's—number units)	125,156	89,482	118,229	110,759

* Dates on request. † 1948 weekly capacity is 1,802,476 net tons. 1947 weekly capacity was 1,749,928 net tons.

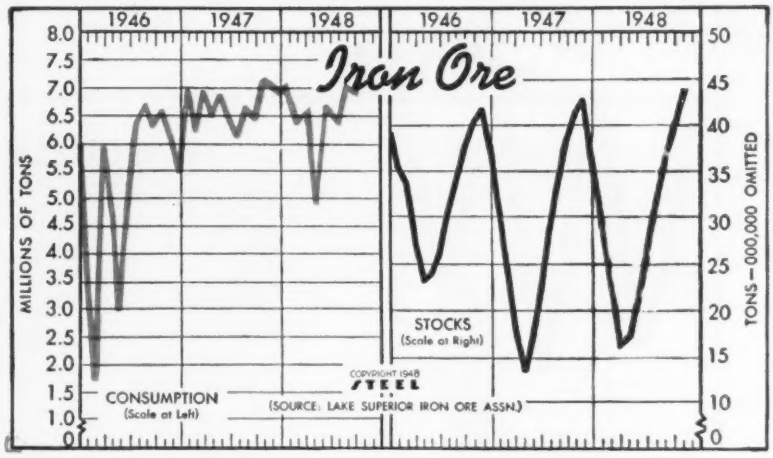
TRADE				
Freight Carloadings (unit—1000 cars)	840†	723	843	879
Business Failures (Dun & Bradstreet, number)	126	101	104	60
Money in Circulation (in millions of dollars)‡	$28,325	$28,305	$28,254	$28,817
Department Store Sales (changes from like wk. a yr. ago)‡	−5%	−6%	+2%	+10%

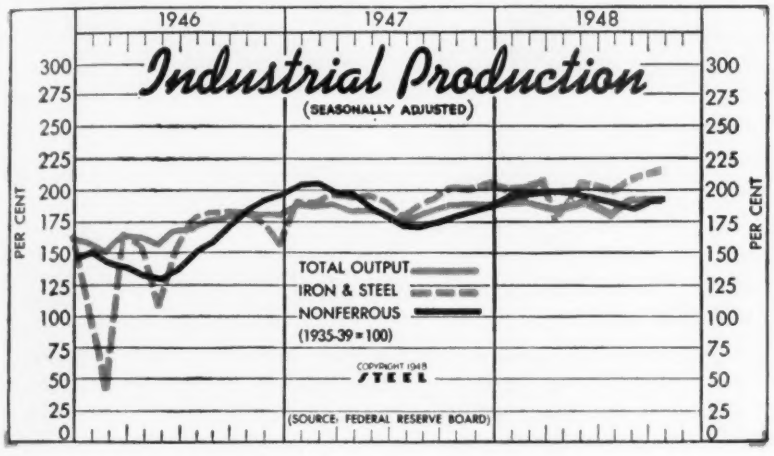
† Preliminary. ‡ Federal Reserve Board.

Iron Ore

(Lake Superior Iron Ore Assn.)
Gross tons—000 omitted

	Consumption		Stocks at Lake Erie Docks and Furnaces	
	1948	1947	1948	1947
Jan.	7,057	7,024	29,081	30,514
Feb.	6,440	6,264	22,628	24,317
Mar.	6,634	6,979	16,022	17,411
Apr.	4,976	6,579	17,125	13,555
May	6,656	6,885	22,058	17,618
June	6,577	6,500	26,965	21,746
July	6,479	6,156	32,611	28,440
Aug.	7,036	6,638	37,081	33,896
Sept.	6,965	6,492	40,923	38,370
Oct.	7,398	7,151	43,883	41,641
Nov.	....	7,068	.....	43,010
Dec.	....	6,970	.....	36,095
Total	....	80,807		





Federal Reserve Board's Production Indexes

(1935-39 = 100)

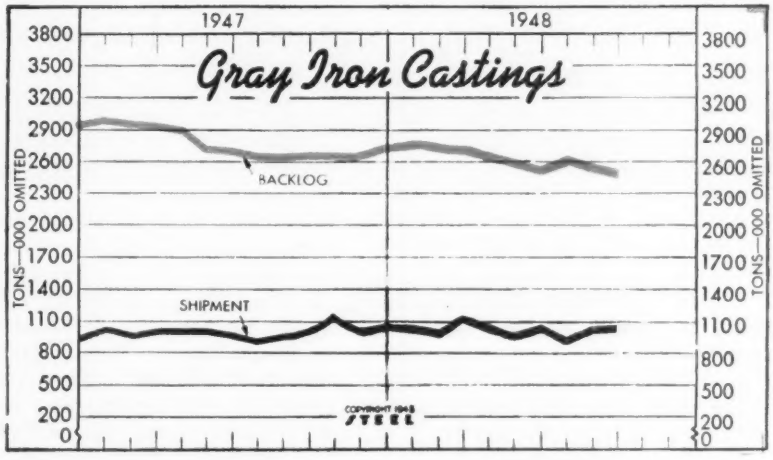
	Total Production		Iron, Steel		Nonferrous	
	1948	1947	1948	1947	1948	1947
Jan.	193	189	203	192	197	203
Feb.	194	189	203	191	197	208
Mar.	192	190	207	196	200	202
Apr.	188	187	177	195	198	197
May	191	185	206	197	197	187
June	192	184	207	193	193	179
July	186	176	200	181	185	171
Aug.	191	182	207	188	186	170
Sept.	191	186	214	190	191	174
Oct.	195	190	221	205	190	179
Nov.	...	192	...	202	...	185
Dec.	...	192	...	205	...	189
Ave.	...	187	...	193	...	186

Gray Iron Castings

(U. S. Bureau of Census)
Tons—000 omitted

	Shipments		Backlogs*	
	1948	1947	1948	1947
Jan.	1,064	1,078	2,803	3,021
Feb.	1,024	1,010	2,769	2,987
Mar.	1,169	1,090	2,726	2,979
Apr.	1,051	1,097	2,691	2,909
May	993	1,097	2,602	2,783
June	1,072	1,038	2,587	2,711
July	914	913	2,601	2,657
Aug.	1,051	952	2,599	2,631
Sept.	1,088	1,025	2,587	2,680
Oct.	....	1,154	....	2,669
Nov.	....	1,020	....	2,687
Dec.	....	1,066	....	2,782
Total	....	12,541		

* Unfilled orders for sale to the trade.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$12,574	$14,484	$13,076	$13,414
Federal Gross Debt (billions)	$252.6	$252.5	$252.5	$258.0
Bond Volume, NYSE (millions)	$16.5	$13.3	$21.3	$27.5
Stocks Sales, NYSE (thousands)	6,352	4,570	9,392	5,303
Loans and Investments (billions)†	$62.5	$62.6	$62.4	$65.0
United States Gov't. Obligations Held (millions)†	$33,073	$33,525	$33,526	$37,724

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$95.50	$95.50	$95.05	$76.09
STEEL's Nonferrous Metal Composite‡	232.6	232.6	227.9	179.4
All Commodities†	165.1	164.9	164.2	161.0
Metals and Metal Products†	173.8	173.8	172.6	150.9

† Bureau of Labor Statistics Index, 1926=100. ‡ 1936-1939=100.

Men of Industry

THOMAS J. LINGLE

GEORGE M. BRYSON

C. H. HALLETT

Taylor Forge & Pipe Works, Chicago, announces the appointment of **Thomas J. Lingle** as Western Division manager in charge of manufacturing operations at its new Fontana, Calif., plant. He also will direct West Coast sales. Mr. Lingle was formerly associated with C. F. Braun Co., Alhambra, Calif., and since 1946 operated his own valve and fittings business in Alhambra. The Fontana plant of Taylor Forge has begun production of spiral pipe, and forging operations will begin soon.

—o—

National Screw & Mfg. Co., Cleveland, announces the following promotions: **Ben H. Jones** has been appointed vice president in charge of sales, **Donn D. Greenshields,** vice president in charge of production; and **George F. Jenkins** has been made manager of industrial sales.

—o—

Frank L. Oldroyd has been appointed sales manager of the Industrial Division, Oakite Products Inc., New York. He has been associated with the Oakite organization in the servicing of its specialized industrial cleaning and allied materials for over 15 years. He served as division manager in the company's divisional offices in Atlanta and Chicago, then as special field sales manager for a year prior to his new appointment.

—o—

Anaconda Wire & Cable Co., New York, announces the following appointments: **L. F. Hickernell** as chief engineer, to direct the engineering and research policy of the company and act as consultant to customers as well as executive and manufacturing departments of the company. He will be aided by **L. L. Carter** and **D. E. Allen** as assistant chief engineers, both located at Hastings-on-Hudson, N. Y., engineering headquarters. **A. A. Jones,** appointed manager engineering department, will be in direct supervision of the engineering and research operations.

—o—

George M. Bryson has been promoted by Bethlehem Pacific Coast Steel Corp., San Francisco, to the position of supervisor of piecework rating. He transfers from the company's Los Angeles plant, where he had been chief rate setter. He has been connected with the company 13 years.

—o—

Lemuel B. Hunter has been appointed manager, raw materials department, Inland Steel Co., Chicago. He had been fleet manager of the company since 1943. **Carl B. Jacobs** has been named to succeed Mr. Hunter as fleet manager.

—o—

Roscoe Seybold, vice president, Westinghouse Electric Corp., Pittsburgh, has been elected assistant to the president, with special responsibility for organizational planning, budget and operating expense control. **C. E. Headlee** has been appointed controller, succeeding Mr. Seybold in that position. Mr. Headlee had been assistant controller for the past two years.

—o—

Henry Getz has been appointed manager of the Baltimore branch of National Lead Co. He joined the company in 1923 in the general office accounting department. He later served with Canada Metals, subsidiary company, and in 1937 became manager of Great Western Smelting Co. Ltd., Canada Metals subsidiary in Vancouver, British Columbia. In 1943 he was transferred to the Toronto office of Canada Metals. **C. W. Gesregan,** manager, Metal Division, Atlantic branch of National Lead Co., is retiring at the end of the year after 46 years of service. **Henry F. Freiherr** has been appointed manager of the Metal Division of the Atlantic branch, succeeding Mr. Gesregan. He has been Baltimore branch manager since 1938.

—o—

Joseph T. Ryerson & Son Inc., Chicago, announces the appointment of **C. H. Hallett** as manager of sales at its Los Angeles plant. Before association with Ryerson in 1941 Mr. Hallett was connected with Inland Steel Co., Chicago. He was transferred to Los Angeles this year from Chicago, where he had been serving as assistant to the sales manager.

—o—

Harrisburg Steel Corp., Harrisburg, Pa., announces the election of **Joseph T. Simpson** as president to succeed **Wilbert Wear,** retired. Mr. Wear, however, will remain with the corporation in a consulting capacity. Other elections announced are: **H. M. Reeser,** vice president and secretary; **D. M. Horner,** vice president; **E. L. Martin,** assistant treasurer; and **C. M. March,** assistant secretary; **W. H. Troyer** continues as treasurer of the corporation, and **J. H. Whitmoyer** has been named general superintendent. Mr. Reeser will be in charge of sales, and Mr. Horner in charge of operations.

—o—

B. J. Heiser, associated with Central Ohio Steel Products Co., Galion, O., for 22 years, and former vice president and sales manager, has been elected president of the company. He succeeds the late **Gilbert L. Stiefel. Oliver C. Henkel** was named executive vice president and treasurer, **Norman**

BEARING FAILURES DOWN... STEEL PRODUCTION UP

Sun Grease Increases Production by Cutting Bearing Failures 92%

Burned-out table roll bearings were causing loss of valuable production-time in a steel mill. The failures—as many as five a week—were due to the grease melting and running out as a result of heat reflected from the steel plates. Each bearing-replacement cost $80, not counting labor cost.

A Sun Engineer who was called in recommended a high-melting-point grease that had proved its ability under similar conditions.

With this Sun lubricant on the job, 92 percent of the bearing failures have been eliminated. A cash saving of about $18,000 a year has resulted, and additional economies have been realized from greater production, power savings, and lower grease costs.

Sun "Job Proved" lubricants are helping to increase production, and to cut maintenance costs, in every kind of industry. What they do for others, they can do for you. For full information, call or write your nearest Sun Office.

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"JOB PROVED" IN EVERY INDUSTRY

SUNOCO

J. Schnelker, vice president in charge of operations, and **Walter C. Mason,** secretary.

—o—

Walter A. McGibbony has been named manager, Monroe, Mich., plant, Kelsey-Hayes Wheel Co., succeeding **J. C. Hahannah,** who has taken charge of the McKeesport, Pa., plant. **Walter Smith** has been named to succeed Mr. McGibbony at Monroe.

—o—

Robert T. Hazell has been appointed vice president, Fruehauf Trailer Co., of Canada, Ltd., Toronto. He has held the positions of sales manager and general manager since joining Fruehauf.

—o—

Jule Leroy has joined Loewenthal Metals Corp., Chicago, as buyer and salesman. He has been associated with the nonferrous industry in the Chicago district for a number of years.

—o—

Joseph W. Kelley has been appointed division sales manager, Special Equipment Division, Patterson Foundry & Machine Co., East Liverpool, O. He will be in charge of specially designed chemical and process apparatus. Mr. Kelley was formerly assistant sales manager of Goslin-Birmingham Co., Birmingham. His headquarters will be at East Liverpool, O.

—o—

Lee Cameron has been elected president and general manager, Superweld Corp., Glendale, Calif. **Walter T. Wells,** who was formerly president and general manager, has been named chairman of the board. He is also chairman of the board of Lane-Wells Co., an oil-tool manufacturing concern. Mr. Cameron was formerly secretary and treasurer, Interstate Aircraft & Engineering Corp., with which he was affiliated from 1938 to 1944. He had previously been treasurer of Vultee Aircraft Corp. **S. S. Webster Jr.** has been named secretary; **Robert E. Jones,** vice president, was also elected treasurer; and in addition to Messrs. Wells and Jones, **Harold C. Hill,** General Electric Co., Los Angeles, and **William M. West,** West & Co., are directors of Superweld Corp.

—o—

Dr. Ernest H. Volwiler, executive vice president, Abbott Laboratories, North Chicago, Ill., has been chosen president-elect of the American Chemical Society. He will head the society in 1950. During 1949 the president will be **Prof. Linus Pauling,** chairman of the division of chemistry and chemical engineering in the California Institute of Technology, who will take office Jan. 1, succeeding **Dr. Charles A. Thomas,** executive vice president, Monsanto Chemical Co., St. Louis.

—o—

M. J. Greiveldinger, since 1934 president and general manager, Kwik-Mix Co., Port Washington, Wis., has retired from active service, but will remain a member of the board of directors.

—o—

Robert K. Follansbee has been elected vice president in charge of sales, Follansbee Steel Corp., Pittsburgh. He has been secretary and treasurer of the corporation, with which he has been connected for 20 years. **George W. Ballantine** has been appointed as sales manager, Sheet Metal Specialty Division. He has been connected with Niles Steel Products Division, Republic Steel Corp., where he has had many years of experience in the production and sale of stampings. Other changes in organization announced by the corporation include the appointment of **C. F. K. Appel** as acting secretary and treasurer; **William M. Bausch** as sales manager, mill products; and **C. G. Carlile** as sales representative, Sheet Metal Specialty Division, in Ohio.

—o—

Pittsburgh Chapter, Institute of Scrap Iron & Steel Inc., has elected the following officers to serve the 1949 term: **Herman Caplan,** M. W. Singer Co., president; **Samuel Goldberg,** Pennsylvania Iron & Steel Co., vice president; **Paul Stocker,** H. F. Stocker Co., secretary; and **Robert Jacobson,** Luria Bros. & Co. Inc., re-elected treasurer. Mr. Caplan succeeds **Leonard H. Krieger,** Southwest Steel Corp., as president.

—o—

Malcolm Campbell, for seven years personnel director, Palace Corp., Flint, Mich., has resigned to join the industrial relations staff, Great Lakes Steel Corp., Detroit.

—o—

W. J. Reuscher has been appointed controller, Hudson Motor Car Co., Detroit. He formerly was vice president and treasurer, Bendix Home Appliance Co.

—o—

Edward M. Ryan has been named director of foreign operations for International Harvester Co., Chicago. He succeeds **Clyde King,** who retired to accept an appointment as chief of the Economic Cooperation Administration in Austria.

—o—

Alexander S. Moody, commercial vice president in charge of customer relations work in the northwestern states with headquarters at Portland, Oreg., General Electric Co., has retired after 42 years with the company.

—o—

Robert L. Halsted has been named manager of the Cleveland district office, Allis-Chalmers Mfg. Co. He has been manager of the Charleston, W. Va., office, which he established for the company. He succeeds the late **Arthur Wyman** at Cleveland, and **James Mathews,** Charleston sales representative, assumes the position of manager at Charleston.

—o—

C. L. Beatty, W. R. Krepps, D. J. Vail and **L. K. MacGregor** have been elected to vice presidential positions by Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich. Mr. Beatty, formerly the company's only vice president, has been elevated to executive vice president. For the past 25 years he has been general manager of the company's National Motors Casting Division at South Haven, Mich. Mr. Krepps, assistant manufacturing manager since 1947, has

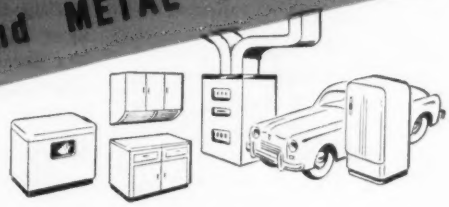
JOSEPH W. KELLEY

ROBERT K. FOLLANSBEE

BOOST PRODUCTION

Cut Costs with CLINCH-ON-NUTS

FLOATING NUTS • WELD NUTS and METAL SPECIALTIES



Because they simplify assembly and speed production, CLINCH-ON NUTS are cutting costs for many manufacturers of refrigerators, automobiles, ranges, stokers, kitchen equipment and many other products.

The variety of fasteners, clips, small metal stampings and similar items is solving many assembly and production problems quickly, simply and at costs meeting your requirements.

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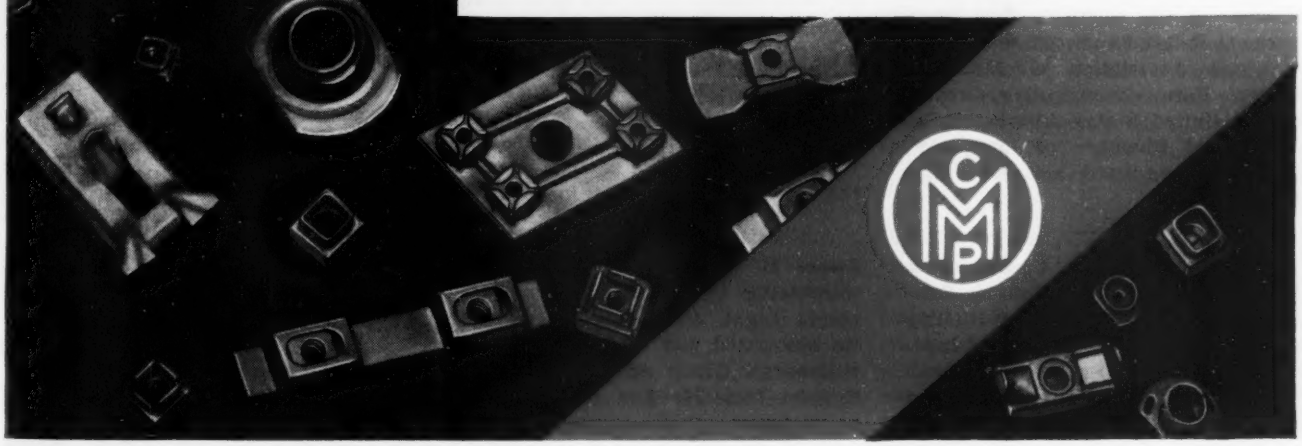


been with the foundry company since 1915. Mr. Vail became associated with the company in 1930 as an experimental engineer, and has been general manager of the Muskegon Hts. plant since 1946. Mr. MacGregor joined the company in 1944 as manager of the Muskegon plant, Broadway Ave., and was made sales manager in 1946.

—o—

Robert C. Artner has been appointed vice president and general manager, Midland Steel Products Co., Cleveland. **David S. Greer**, controller since 1944, has been appointed treasurer and controller, and **Howard E. Lemmerman,** assistant to the president, becomes a permanent member of the company operating committee. Mr. Artner has been treasurer of the company since 1936.

—o—

L. E. Ritzman has been appointed sales manager, Whittington Pump & Engineering Corp., Indianapolis. Prior to his joining the company about a year ago as sales engineer, he was associated with Sabin Engineering Co., Cleveland.

—o—

Lewis B. Kinney, Denver, has been appointed exclusive sales representative in Colorado for Babcock & Wilcox Tube Co., Beaver Falls, Pa. For the past five years, Mr. Kinney has operated as a manufacturer's representative in the Rocky Mountain area. Prior to 1943, he was associated first with Carnegie-Illinois Steel Corp., and later with LaSalle Steel Co. He will maintain an office in the Albany Hotel Bldg., 1728 Stout St., Denver.

—o—

Dr. Courtnay Pitt has been elected to the newly created office of vice president of finance, Philco Corp., Philadelphia. In this capacity he will serve as the chief financial officer of the company. He has been a member of Philco Corp. since 1941.

—o—

Arvid L. Frank has been appointed director of the newly created International Relations Department of the National Association of Manufacturers. Formerly executive director of the United States Associates, International Chamber of Commerce, Mr. Frank assumed his new duties Dec. 1.

—o—

Appointment of **John C. Barnes** to vice president—sales, Eastern Division, has been announced by Rittling Corp., Buffalo, manufacturer of heating equipment. Mr. Barnes recently resigned as vice president for sales, National Radiator Co., having

ROBERT M. PARKE

been affiliated with that company for eight years as sales engineer during the war, and as branch manager of its Philadelphia office. For the present Mr. Barnes is making his headquarters in Philadelphia.

—o—

Robert M. Parke has joined the staff of Battelle Memorial Institute, Columbus, O., where he will act as technical adviser in Battelle research on high-temperature-resistant materials. An authority on the production and development of refractory metals, Mr. Parke, during the past two years, supervised work in metallurgy at the Applied Physics Laboratory, operated jointly by Kellex Corp., Silver Spring, Md., and Johns Hopkins University. Prior to that he was director of research, Climax Molybdenum Co., Detroit. **Dr. H. P. Munger,** for 19 years associated with the steel industry in product development and production work, has joined the Battelle Memorial Institute. He will engage in chemical engineering. Dr. Munger has been successively connected with the Mellon Institute, American Rolling Mill Co., Republic Steel Corp., Van der Horst Corp., and Youngstown Sheet & Tube Co. He is best known in the metals technology field for his development and production work on electroplated sheet and strip steel.

—o—

F. C. Berliner has joined Maysteel Products Inc., Mayville, Wis., as sales manager. He has had wide experience representing manufacturers, and in recent years has been associated with the fabricated sheet metal industry.

—o—

James E. Coleman has been named purchasing agent for the Manufacturers Light & Heat Co., and for its associated gas companies in the Pittsburgh Group of Columbia Gas System Inc. He has been serving as assistant purchasing agent since July. Mr. Coleman succeeds **John M. Simpson,** retired after many years of gas company service.

—o—

Kelly Reamer Co., Cleveland, announces the appointment of **G. Henry Keeton,** 6432 Cass Ave., Detroit, as sales and engineering representative for Michigan.

—o—

Ralph W. Rager has been elected vice president, Oil Well Supply Co., U. S. Steel Corp. subsidiary, at Dallas, Tex., and **Erwin P. Kraatz** was named controller of the company. In his new post, Mr. Rager, who has been controller since 1944, will serve as administrative assistant to the president.

—o—

American Type Founders Sales Corp.'s offset sales department, New York, which has been headed by **Kenneth R. Burchard,** has been divided into two departments, photomechanical sales, and offset press sales. **DeWitt G. Manley,** formerly assistant to Mr. Burchard, has been placed in charge of the new offset press sales department, and Mr. Burchard is manager of the photomechanical sales department.

—o—

William F. Ritchie has been named sales manager, Rylander Mfg. Co., Detroit, manufacturer of stampings, assemblies and dies. Mr. Ritchie has had 20 years of experience in the stamping field. He formerly was with Kelvinator Corp., and Packard Motor Car Co.

—o—

The Virginia Management Executives Group of Gray Iron Founders' Society was formed at a meeting in Richmond, Va., attended by leading gray iron foundrymen from the state. **J. Scott Parrish Jr.,** president, Richmond Foundry & Mfg. Co., was elected chairman; **R. G. Harris,** secretary-treasurer, Strickland Machine Co., Richmond, was named vice chairman.

—o—

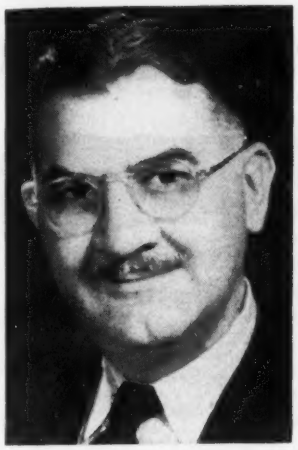
H. C. Bosch has been appointed manager of the Oakland, Calif., sales office for General Electric Co.

—o—

George R. Coffin has been made assistant district manager, Portland, Oreg., warehouse, United States Steel Supply Co. **Edward C. LaBart** has been named assistant manager of the company's warehouse at Seattle.

—o—

Eugene McAuliffe, recently retired chairman of the board of Union Pacific Coal Co., Rock Springs, Wyo., has been awarded the Erskine Ramsay Gold Medal by the American



MARTIN C. BUTTERS

Has joined the staff of O. K. Tool Co. Inc., Shelton, Conn. Noted in STEEL, December 6 issue, p. 104

PAUL A. MAY

Appointed controller of Mine Safety Appliances Co., Pittsburgh. Noted in STEEL, December 6 issue, p. 107

J. O. CROSS

Appointed director of industrial relations, U. S. Radiator Corp., Detroit. Noted in STEEL, December 6 issue, p. 107

Institute of Mining & Metallurgical Engineers. It will be presented to Mr. McAuliffe at institute's annual banquet in San Francisco, Feb. 16.

—o—

Robert H. Taylor, vice president in charge of sales, Florence Stove Co., Gardner, Mass., has been elected president of the company, succeeding the late **Edward F. Dobson.**

—o—

Frank W. Bleiler has been appointed assistant manager of sales, Milwaukee Spring Co., Milwaukee, Division of Illinois Coil Spring Co. Mr. Bleiler was formerly Milwaukee district representative for Steel & Tube Division, Republic Steel Corp.

—o—

B. H. Sloane has been named chief production superintendent of Aluminum Co. of America's Vancouver, Wash., plant. **C. T. Heins** is the new assistant production superintendent.

OBITUARIES . . .

H. Edgar Lewis, 66, retired president and chairman of the board, Jones & Laughlin Steel Corp., Pittsburgh, died of pneumonia Dec. 5. He resigned his positions with the company two years ago, because of failing health. Mr. Lewis was made executive vice president of Bethlehem Steel Co. in 1916, and in 1930 left that company to become chairman of the executive committee of Jeffrey Mfg. Co., Columbus, O. He was elected chairman of the board of directors, a director and a member of the executive committee of Jones & Laughlin Steel Corp. in 1936, and president of that corporation in 1938.

—o—

Harry B. Burr, 53, for many years manufacturers' representative in the automotive industry with headquarters in Detroit, and district manager, Unity Mfg. Co., Chicago, died Dec. 2 in Howell, Mich., as a result of injuries suffered in a motor accident.

—o—

Fred S. Welch, 69, founder of the Welch Motor Car Co., Pontiac, Mich., and builder of one of the first shaft-driven automobiles, died at Watkins Lake, Mich., Dec. 2. He held a number of patents in connection with automotive manufacturing processes.

—o—

William R. Wilson, 71, for many years treasurer, Good Roads Machinery Co. of New York Inc., New York, died recently.

—o—

Walter D. Monroe, 59, president and founder, Chicago Steel Service Co., Chicago, died recently.

—o—

Boyd Dudley Jr., 60, president, E. C. Stearns & Co., Syracuse, N. Y., died Dec. 2.

—o—

John S. Casey, 68, president, M. H. Treadwell Co., manufacturing engineer, New York, died Dec. 1. He also was chairman of the board of Treadwell Engineering Co., Easton, Pa., and president, Treadwell Construction Co., Midland, Pa.

—o—

Frank W. Hamilton, 62, president since 1926 of Ulster Iron Works, Dover, N. J., died Dec. 1.

—o—

Bennett M. Leece, 72, co-founder and president, Leece-Neville Co., Cleveland, died recently after an illness of two months. He helped organize the electrical auto equipment plant in 1909.

—o—

L. A. Kobal, 47, secretary-treasurer, John Oster Mfg. Co., Racine, Wis., died Nov. 25. He joined the company in 1924.

—o—

George W. Shores, 55, manager, crusher section of the basic industries department, Allis-Chalmers Mfg. Co., Milwaukee, died Nov. 29 at Oslo, Norway, after a heart attack. He had been in Oslo on business.

—o—

Louis J. Westwood, 76, head of Lloyd & Westwood Machinery Co., Toronto, died recently at Toronto Western Hospital. He was an original partner in the machinery firm which was founded in 1908.

—o—

George S. Trudell, 72, founder, Empire Brass Mfg. Co., London, Ont., died recently.

—o—

William Gaertner, 84, president, Gaertner Scientific Corp., Chicago, maker of specialized research instruments, died Dec. 3.

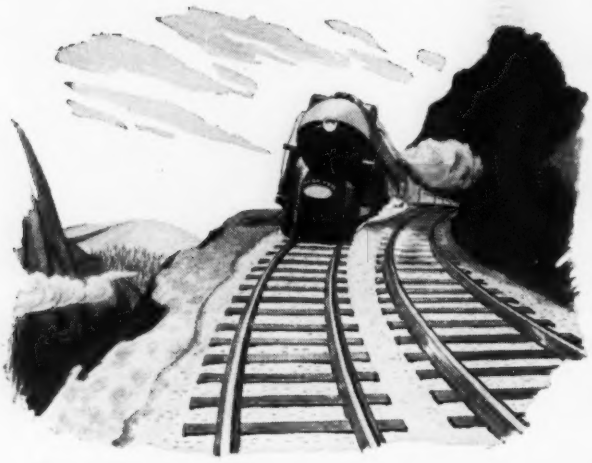
—o—

John A. Williams, 64, foundry superintendent of Dodge Steel Co., Philadelphia, died Dec. 4. Mr. Williams, a foundryman for over 40 years, served in executive capacities with several foundries and was president of Metropolitan Steel Casting Co., Newark, N. J., prior to his association with Dodge Steel.

—o—

Herbert L. Shearer, 69, former general manager of American Brass Co.'s plant at Kenosha, Wis., died Dec. 5, following a long illness. Prior to his retirement two years ago, Mr. Shearer was foundry superintendent, Winchester Repeating Arms Co., New Haven, Conn.

Let Morse grease the rails for your tough jobs too!

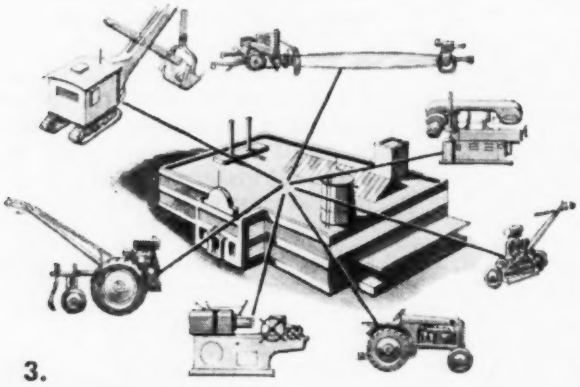


1.

Sc-r-r-ee-ch! Railroad men know this noise means that expensive train wheels and rails are wearing away on curves. To prevent this wear, automatic greasers were installed to lubricate wheels and rails. Old-style ratchet type clutches were tried, but slipped or didn't feed grease right. American Brake Shoe Company's Ramapo Ajax Division solved this knotty problem...

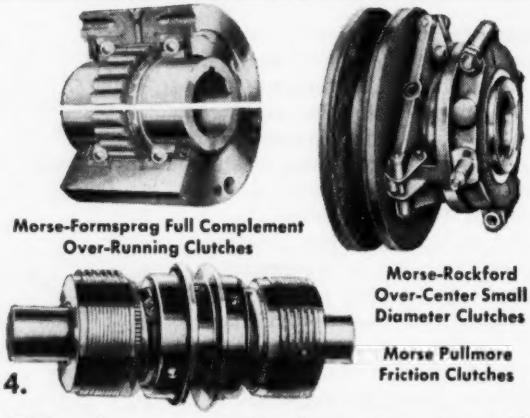
2.

They now use Morse-Formsprag Clutches. The positive action of Morse-Formsprag Clutches is far superior in performance, dependability and service over the old ratchet type. *M-F Clutches engage instantly; allow no back-slip; feed grease to every passing wheel.* Other complex operations on your products may call for Morse-Rockford Friction Clutches...



3.

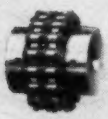
Morse clutches fill almost every need you can imagine. Can the sales and mechanical value of your own products be enhanced by using Morse clutches? Leading manufacturers of such items as construction equipment, cultivators, saws, pumps, lawn mowers and machine tools have bettered *their* products with Morse clutches. How about you? Do this now...


Morse-Formsprag Full Complement Over-Running Clutches
Morse-Rockford Over-Center Small Diameter Clutches
Morse Pullmore Friction Clutches

4.

Write for expert clutch engineering aid and consultation. For new ideas, send for clutch catalogs: Morse Formsprag Clutch Catalog, No. C11-48; Morse Pullmore Clutch Catalog, C31-47; Morse-Rockford Clutch Catalog, SDOC. Address: Morse Chain Company, Department 259, 7601 Central Avenue, Detroit 8, Michigan.

Morflex Couplings



Roller Chain Couplings

Silent Chain Drives

MORSE

MECHANICAL POWER TRANSMISSION PRODUCTS

A PRODUCT OF B-W BORG-WARNER

Morflex Radial Couplings

MORSE CHAIN COMPANY • DETROIT 8, MICHIGAN

Engineering News . . . AT A GLANCE

"PIN-POINT" HARDENING—No special equipment is required when employing a method of selective case hardening steels, discovered by Denfis Chemical Laboratories Inc., Brooklyn, N. Y. It simply involves the use of a paste on the section to be treated and heating the work to about 1700° F. According to the company, a case 0.010-inch thick can be formed in 5 to 7 minutes, and one 0.040-inch in about 25 to 30 minutes. After initial heating, the work is cooled then reheated 1500° F after which the paste—at that point brittle—is easily knocked off prior to quenching. Any source of heat can be used with the method.

SPRAYED-ON HEATING ELEMENTS— Engineers of E. R. Hall Co., North Hollywood, Calif., report development of a new electrical-conductor plastic which can be sprayed on a surface to become a heating element following curing. Material, already being used by Douglas Aircraft Co. Inc., for thermal anti-icing of combustion heater intakes, is currently being tested for heating of aircraft gun mechanisms and bomb shackles. Forty-five square inches of the plastic product is sprayed on the Douglas intake—a compound-curvature aluminum part. Resulting "element" receives 250 watts on a 27-volt circuit.

AIMED IN ANY DIRECTION— Mobile betatron, a 10-million-volt x-ray generator, now being installed at the Naval Ordnance Laboratory, White Oak, Md., is said to produce rays capable of penetrating 16 inches of steel. Engineers state it can take a "picture" of a 1-inch thick piece of steel in 1 second. The machine also can be aimed in any direction whereas all other equipment of this type is held in one fixed position. Portable with the use of a crane, the entire unit weighs 5500 pounds. The Navy expects to use it for studying complex internal assemblies of mines, torpedoes and other naval ordnance items.

BETTERS WIRE PROPERTIES— Refined special processing methods currently employed by Riverside Metal Co., Riverside, N. J., now enables the company to impart superior properties in wire used for springs. In grade A phosphor bronze wire, for example, the concern achieves a minimum increase of 10,000 pounds per square inch in tensile value, without changing the standard alloy specifications. The increase in tensile value, the company states, may be instrumental in bringing about changes in spring design.

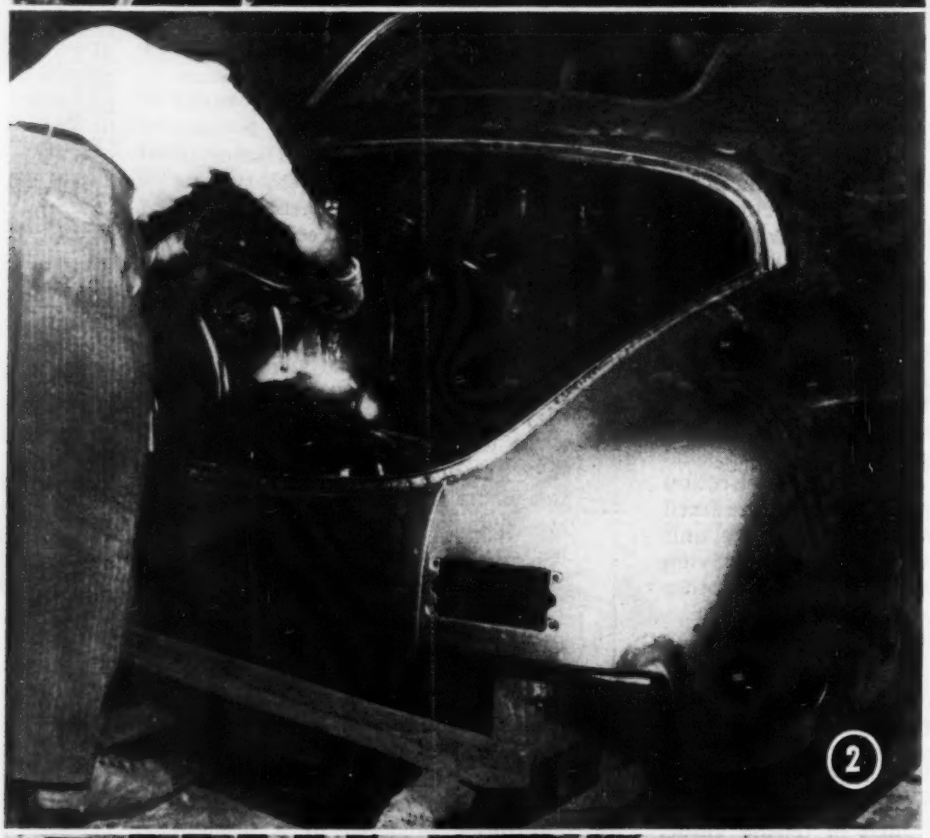
MOLYBDENUM TAKES THE "HEAT"— Molybdenum with a specially designed ceramic coating offers a promising combination for very high temperature services—those in excess of 1800° F—according to scientific investigators of the National Bureau of Standards conducting research on high-temperature metals under sponsorship of the National Advisory Committee for Aeronautics. Coatings developed to provide such protection to molydenum are applied in form of water suspensions or "slips" to cleaned specimens by either dipping or spraying. After drying, pieces are fired at a temperature of 2150° F in oxygen-free atmospheres. The furnace is the only special equipment employed beyond that normally used in applying ceramic coatings.

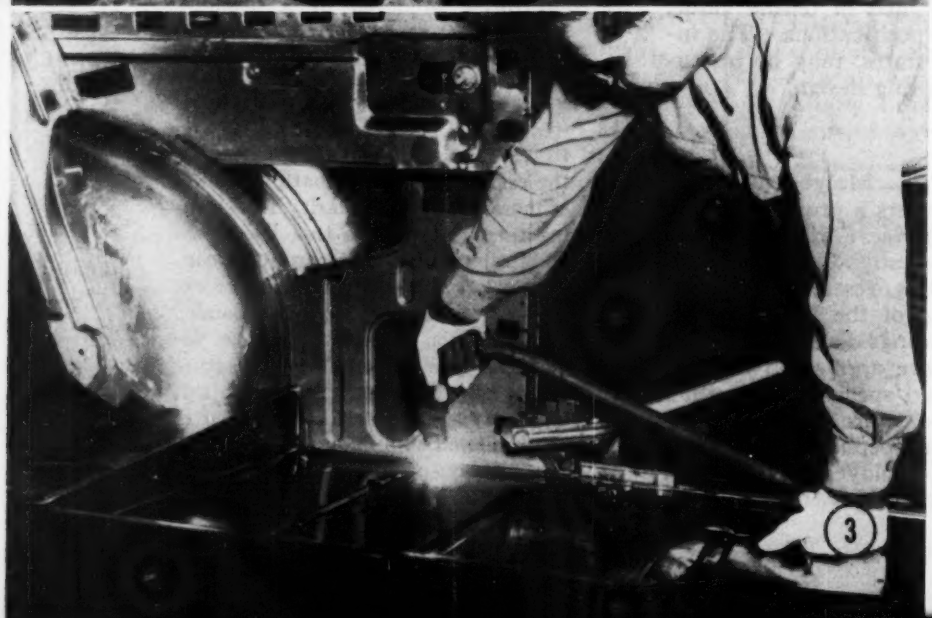
NEW JOINING PROCESS—Ability to produce spot welds from one side of the joint only is the principal feature of a new process of spot welding—inert gas-shielded arc spot welding. Timing device used in connection with apparatus used is similar to that employed for resistance spot welding except that longer time cycles are required for the arc. Instead of circuits for "squeeze" and "hold" there is a circuit for argon shut-off delay. (p. 84)

MATTER OF RELIABILITY—Because of occasional unreliability in calculating hardenability from chemical composition, hardenability bands established during the past 2 years were based on a statistical study of actual end-quench hardenability tests from hundreds of production heats. In formulating H-band steels, chemical ranges for individual elements were made wider than those of equivalent AISI-SAE standard steels for two reasons. First was to allow the use of heats that were outside customary AISI-SAE compositions, but within the hardenability limits which were set up arbitrarily tighter than encountered in tight composition limits; second was to allow the steel maker enough latitude to adjust his melt for individual elements. (p. 88)

ELECTROLYTIC CHROMIUM — Electrolytic chromium, which compares favorably with metal produced from conventional chromic acid plating solution, may be deposited continuously at a current efficiency of 60 per cent from a chromic sulphate electrolyte produced by a leaching procedure, it was reported before the Electrochemical Society in New York recently. (p. 91)

CUTS CLEANING COSTS—One of the reasons why fused bath descaling is increasing in popularity for cleaning ferrous metals is that the method is rapid and can be carried on continuously. Intricate castings, for example, may be descaled and desanded at a fraction of time and cost involved in previous methods. Feature of the process is its tendency, in this case, to degraphitize the surface of castings and to provide a better bond for subsequent enameling or finishing operations. (p. 106)





New Joinin

"ONE SIDE

Ability to join two lapped pieces of metal from one side only and without need of forging pressure on the fused nugget is one of the outstanding features of the inert gas-shielded arc spot welding method. It employs a 2-pound gun through which argon gas is passed

By F. J. PILIA
Development Engineer
The Linde Air Products Co.
Newark, N. J.

Fig. 1—Spot welding front door post to floor pan in framing jig

Fig. 2—Body brackets are joined to floor pan by spot welds

Fig. 3—Welding side panel assembly to floor pan as body is assembled in framing jig

...ining Process Makes Possible ...DESPOT WELDS

WITH a new process of spot welding, namely, inert gas-shielded arc spot welding, the weld is produced by the heat from an electric arc applied to the top surface of two lapped pieces of metal. Welding action is controlled by current input to the arc and time the arc is allowed to dwell upon the material to be welded. The arc, tungsten electrode and fluid puddle are shielded with an inert gas, in a manner similar to that employed in the conventional inert gas-shielded arc welding process.

A resistance spot weld is produced by the effect of high-current and pressure applied to the electrodes, while a gas-shielded spot weld is produced with fusion alone. Since no forging pressure is required on the fused nugget, consequently no backup or access to the reverse side of the weld is necessary. This accounts for one of the major advantages of the gas-shielded spot welding process—the ability to produce spot welds from one side of the joint only.

Apparatus required for the operation consists of a standard 60-cycle alternating current metal arc welding transformer with a built-in high-frequency unit. The transformer preferably should have power factor correction. A timing device similar to that used for resistance spot welding is employed, except that longer time cycles are required for the arc; instead of circuits for "squeeze" and "hold," there is a circuit for argon shutoff delay.

Actual tool for performing the weld consists of a gun of molded plastic about the size of a Colt "45" automatic. The gun is equipped with a water-cooled copper cup which bears against the workpiece. A tungsten electrode from which the electric arc issues is located centrally in this cup and spaced back from the end of the cup by approximately 3/32-inch. This setting varies with the materials being welded and is adjustable from the working end of the cup.

Argon gas distributed through a series of orifices in the electrode holding mechanism is allowed to flow smoothly through the interior of the cup, shielding the electrode, arc, and material being welded. Four V-shaped notches at the base of the cup allow for purging the atmopshere of the cup and for dispelling gases contaminated by welding. The cup is completely insulated from the current-carrying members of the gun.

Three hoses and one switch cord are encased in a rubber jacket approximately 25 feet long to supply the welding current, cooling water, argon gas, and trigger control of the gun. This cable assembly is extremely flexible and rugged, being capable of withstanding considerable abrasion and rough handling on shop floors.

Typical Cycle—A typical cycle is as follows: Two pieces of metal approximately 0.040-inch thick are lapped as a weld sample. Cup of the gun is brought to bear against top of the two pieces. Trigger on the gun is depressed momentarily, closing the main contactor on the power supply to the welding transformer. As the primary contactor closes, the argon solenoid valve in the timing device is opened to allow for the flow of argon gas to the cup of the gun. High-frequency current superimposed upon the welding circuit after the trigger is depressed ionizes a path between electrode and workpiece, allows the 60-cycle

TABLE I

Physical Properties for Various Thicknesses of Mild Steel and Stainless Steel, for Spot Welds Made by the Inert-Gas Process

Test	Gage	Material	Inert Gas
Tension Shear Static Pounds to Failure	0.020	Stainless Steel	1236 lb.
	0.060	Stainless Steel	5018 lb.
	0.032	Carbon Steel	1115 lb.
	0.045	Carbon Steel	1320 lb.
	0.057	Carbon Steel	2150 lb.
	0.094	Carbon Steel	3318 lb.
Direct Tension Static Pounds to Failure	0.020	Stainless Steel	580 lb.
	0.060	Stainless Steel	1986 lb.
	0.032	Carbon Steel	290 lb.
	0.045	Carbon Steel	566 lb.
	0.057	Carbon Steel	1083 lb.
	0.094	Carbon Steel	1850 lb.
Tension Shear Impact Foot Pounds	0.020	Stainless Steel	33.2 ft. lb.
	0.060	Stainless Steel	154. ft. lb.
	0.032	Carbon Steel	42.5 ft. lb.
	0.045	Carbon Steel	61.2 ft. lb.
	0.057	Carbon Steel	83.2 ft. lb.
	0.094	Carbon Steel	117.2 ft. lb.
Direct Tension Impact Foot Pounds	0.020	Stainless Steel	12.1 ft. lb.
	0.060	Stainless Steel	49.1 ft. lb.
	0.032	Carbon Steel	5.8 ft. lb.
	0.045	Carbon Steel	9.2 ft. lb.
	0.057	Carbon Steel	43. ft. lb.
	0.094	Carbon Steel	44.2 ft. lb.
Diameters Inches	0.020	Stainless Steel	.28 in.
	0.060	Stainless Steel	.30 in.
	0.032	Carbon Steel	.14 in.
	0.045	Carbon Steel	.18 in.
	0.057	Carbon Steel	.22 in.
	0.094	Carbon Steel	.28 in.

TABLE II

Welding Conditions and Test Data for Inert-Gas Shielded Arc Spot Welding

Welding Machine—Linde's Heliarc Spot Welder, 400 amp. Miller high-frequency stabilized A.C. welder.
Electrode—¼-inch tungsten electrode.
Specimen Material—1½-inch by 5-inch pieces of 16-gage (0.062-inch) and 14-gage (0.078-inch) type 304 hot rolled, annealed and pickled stainless steel. Specimens were cleaned with emery paper prior to welding.

Welding Machine Settings and Test Results

Sample	Argon Flow liter per minute	Arc Time sec	Amps	Tension-Shear Values—Pounds	Remarks
1	4	2	250	500	Spot shear
2	4	2	250	2145	Spot shear
3	4	2	275	2050	Spot shear
4	4	2	275	1350	Spot shear
5	4	2½	250	3230	Approx. 5/16 in. Button
6	4	2½	250	3565	Approx. 5/16 in. Button
7	4	2½	275	3060	Spot Shear
8	4	2½	275	3420	Approx. 3/8 in. Button
9	4	3	225	3640	Approx. 3/8 in. Button
10	4	3	225	3660	Approx. 3/8 in. Button
11	4	2	250	3000	Approx. 5/16 in. Button
12	4	2	250	2720	Spot Shear
13	Did not weld				
14	4	3	225	3750	Approx. 3/8 in. Button
15	4	3	225	3200	Approx. 3/8 in. Button

Note: All specimens broke as indicated in column headed "Remarks". Those marked "spot shear" broke tearing out no metal. Those marked "button" tore out metal to the approximate indicated diameters.

Fig. 4—Joining windshield frame to rest of front assembly. This location is subsequently covered with body solder

welding current arc to initiate the electric arc required for the weld.

At the time the welding current begins to flow, a relay in the welding current circuit closes, initiating a preset timing cycle through either a mechanical clock or electronic timer. At the end of the correct time interval, the primary contactor on the welding transformer opens and extinguishes the arc. A second timer then continues the flow of argon to allow the electrode to cool in an argon atmosphere. Cooling time is usually 10 to 15 seconds for a $\frac{1}{8}$-inch diameter tungsten electrode. Welding cycle cannot be repeated until the trigger has been released and the arc has been extinguished. This prevents unintentional refiring or time cycles longer than those which have been preset on the timer.

Automobile Applications of Process — Inert gas-shielded arc spot welding process answers most of the problems on automobile body construction. Size and flexibility of the gun makes the process well suited for use on obstructed work. This process is particularly advantageous in the framing jig because the equipment is portable, spot welds are dependable and the gun can be used by nonskilled labor. These factors make it an ideal tool for the assembly lines.

Because the arc is confined primarily within the cup, only flash glasses or plastic face shields are required for protection of the operators. As this process produces no toxic fumes, smoke, or spatter, welding booth and ventilating systems are not required. Also, due to the portability of the apparatus, extreme lightness, and compactness and flexibility in relatively inaccessible spots, the number of spots produced per hour can be greater than that produced with the large and cumbersome special spot welding units required to reach such places.

Another application particularly suited for the process is the production of spots which are subsequently covered with body solder. Previously, it has been necessary to grind the metal-arc weld flush or below the intended surface of the solder fill. With the gas-shielded arc spot welding process, grinding is eliminated. Welds made are relatively flat and require no other preparation prior to filling with solder.

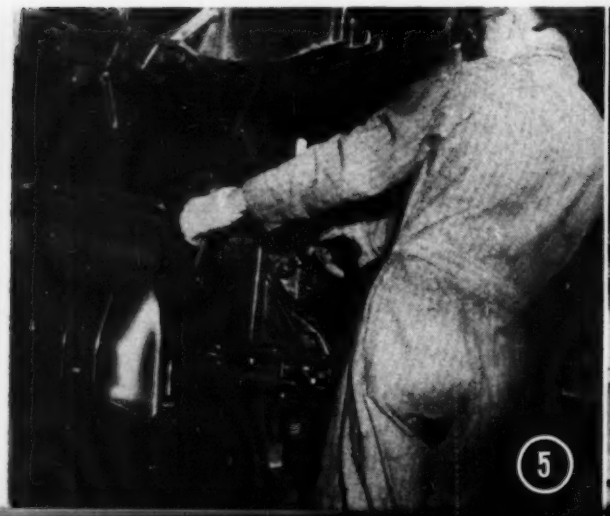
Fig. 1 shows the welding of the front door post assembly to the floor pan in the framing jig. While the joint design is ideal for resistance welding, it was not considered practical because of the size of the unit required to reach around the sections of the body to be welded. Small, round holes visible in this panel were provided for metal-arc plug welding.

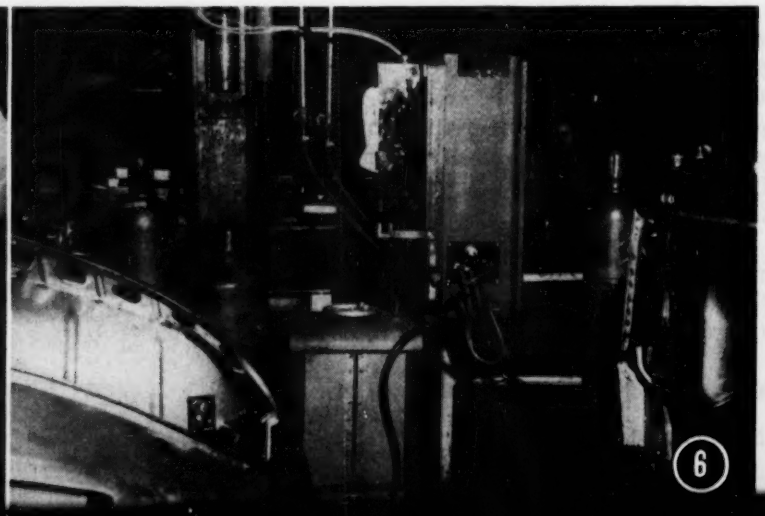
Body brackets are welded to the floor pan shown in Fig. 2. The bracket is made of 0.064-inch material; in this particular operation the weld is being made on the edge of the bracket, the cup being placed halfway over the edge of the bracket. This produces a weld similar to a gas-weld tack. Note that the body is on a wheel dolly and is proceeding down the line during the welding.

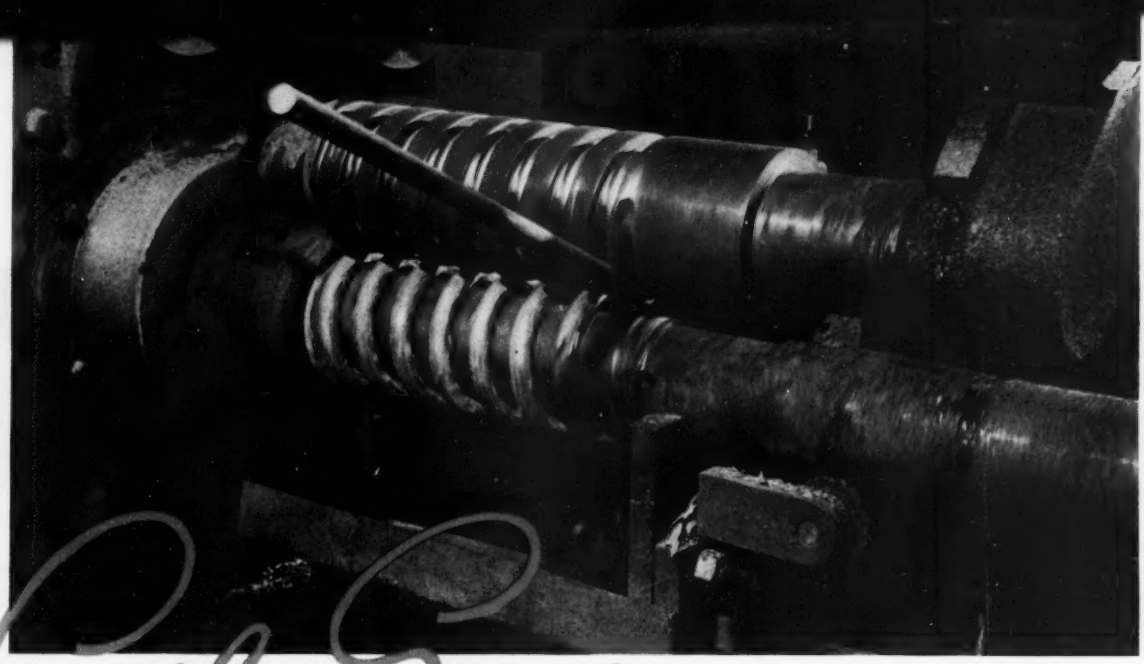
Welding a side panel assembly to the floor pan in the framing fixture is shown in Fig. 3. Usually two gas-shielded spot welds are made on this flange in the fixture and the balance of the welds are made after the body is removed from the fixture and is proceeding down the line. A few carefully selected spots properly located during body framing eliminate much of the poor fitup usually encountered on the line. This particular flange without the welds would open approximately 3/16 to $\frac{1}{4}$- (*Please turn to Page* 118)

Fig. 5—Joining side panels to front during assembly of body in framing jig

Fig. 6—Equipment for inert gas-shielded spot welding consists of transformer, timing control unit, argon cylinder with regulator and flowmeter and hoses for water cooling. All illustrations courtesy Briggs Mfg. Co.





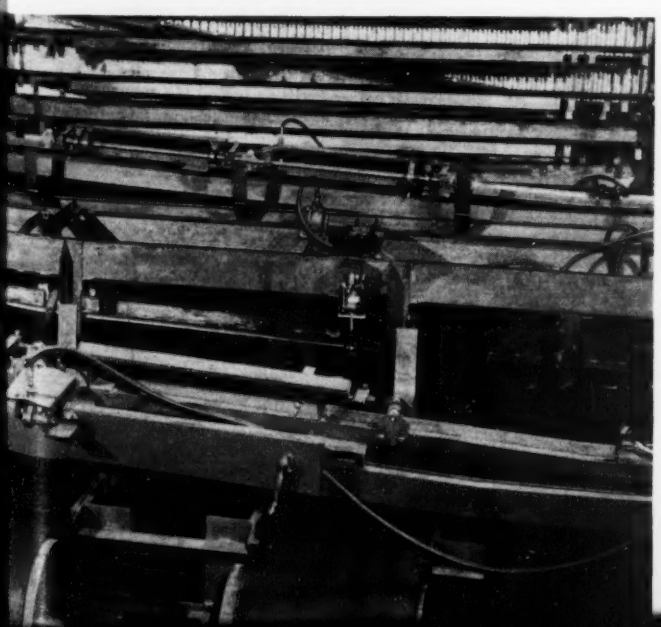


Coil Spring PRODUCTION

Boosted to 650 Per Hour

Under completely mechanized conditions at its Hamilton, O., plant, Ford maintains uninterrupted weekly production at 50,000 units

MECHANIZED production of coil springs on a schedule of 650 per hour or 50,000 per week is under way at the Hamilton, O., plant of Ford Motor Co.'s parts and equipment manufacturing division. Operations start on the first floor of the plant where bar stock is received from freight cars. Precision rolled bars are loaded onto the primary conveyor directly, while rough bar stock is centerless ground. Automatic handling devices move stock from receiving, through the grinding process to an elevator-type conveyor which transfers the bars to an upper floor. Here an automatic conveyor moves bars through a gas-fired furnace which heats ends to 1800° F preparatory to swaging. Squeeze-type rolling machines taper the bar ends, after which they are numbered and conveyed to a heating furnace.



Bar heating furnace brings the entire piece to a temperature of 1700° F in preparation for coiling, another automatic process. Hot bars are ejected from the end of the heating furnace and moved to an automatic coiler to be coiled, tapered end first. This device literally wraps the red hot bar into its final coil shape. When coiled, the springs are ready for the oil quenching machine.

From oil quenching, the springs are moved automatically to draw furnaces where a normalizing process gives all units uniform hardness. Emerging from draw furnaces at a temperature of 820° F the springs are moved under a water spray which brings them to a safe handling temperature and prepares them for the shot peening machines.

Peening machines clean and cold work the springs until their surfaces are smooth, and automatically eject them onto a conveyor which carries the parts to the black paint dip and then passes them through a drying oven.

Springs are quickly dried in the ovens at 450° F and are then transferred to the final operation—testing. In testing, coil springs are first put through a "bulldozing" operation which compresses the spring to solid height. After this the springs are subjected to a weight of 1875 pounds which compresses them to the normal load height of 9.22 inches.

Springs finally are palletized and shipped to branch assembly plants.

Above—Automatic coiler turns heated bar into a coil spring

Left—Round bar stock for coil springs is moved from the receiving department to gas-fired furnaces on elevator-type conveyor

H-BANDS ...Aid Heat

OVER 90 per cent of constructional alloy steel made in the United States is used in the heat treated condition, usually quenched and tempered, to obtain an optimum combination of high strength and toughness. Because of this, alloy steel users have usually written specifications that would give them close control in their heat treatment.

Over the years leading up to the recent war, a general trend was toward tighter chemical analyses ranges for individual elements such as carbon, manganese, nickel, chromium, and molybdenum which resulted in the present AISE-SAE standard alloy steels having very close ranges for all elements. That the practical limits of steelmaking control have been reached in meeting the present ranges of AISI-SAE standard steels is well supported by studies made in 1943 and again in 1946-47 showing that 14 to 16 per cent of open hearth alloy steel is falling outside of the established standard chemical ranges.

This condition would be intolerable to the steelmaker were it not that many of the out-of-specification heats are accepted upon appeal so that the amount of out-of-grade steel actually being rejected rarely exceeds 4 to 5 per cent of that made.

Many users had heats of alloy steel that "looked all right" chemically but which just did not behave as expected in heat treating while other heats that were outside of desirable chemical ranges performed satisfactorily. Consequently, supplementary features were added to specifications such as grain size limitations, tensile properties, special hardening tests, etc., all attempting to weed out the "mavericks" and to achieve closer control of quenched hardness in the part.

During the middle and late thirties, everyone was working on "hardenability," that property which seemed to be an integration of all factors affecting the ability to harden properly. Much light was shed on the role played by chemical composition, grain size, and the effectiveness of the quench. It was finally learned that effects of the various chemical elements on hardenability differed greatly and in a multi-alloy steel, some tool other than the usual chemical analysis and grain size was needed to estimate the potential hardening capacity of a heat of steel.

Fortunately, two tools were developed, one being the hardenability multiplying factors developed by Grossmann by which one could calculate hardenability from the chemical composition and grain size,[1] and the other end quench hardenability test developed by Jominy and Boegehold.[2] The end quench test because of its simplicity and valuable heat treating information that can be obtained from it has become the recognized standard hardenability test for alloy steels in the United States. Fig. 1 shows the end-quench test in operation. A round bar 1 inch in diameter by 4 inches long is heated to the desired heating temperature, then removed and placed in a quenching fixture which directs a jet of water against one end. Since the bar's opposite end is cooled in air, a wide range of cooling rates is obtained (approximately 3½° F per second to 500° F per second at 1300° F). Thus the cooling rate at any distance from the quenched end is known. Hardness measurements are made at 1/16-inch intervals along the surface from the quenched end. This end quench test furnishes the following information about a heat of steel:

1.—Maximum hardness and maximum strength at a cooling rate of about 500° F per second at 1300° F which approximates the fastest quenching possible in most shops.

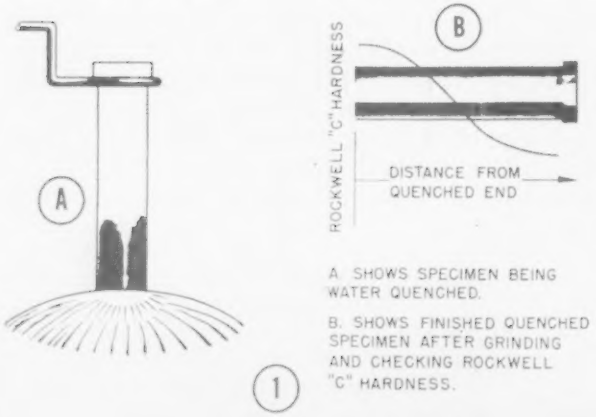
2.—Hardness produced by any cooling rate between 3½° F per second and 500° F per second at 1300° F, and thus a prediction of hardness at any point for which the cooling rate is known, in any part made from the steel.

3.—Effect of the size or mass of the part on the hardness obtainable in heat treating.

4.—Probable microstructure of steel under known heat treating conditions.

5.—An estimate of ordinary mechanical properties.

END QUENCH HARDENABILITY TEST



A. SHOWS SPECIMEN BEING WATER QUENCHED.

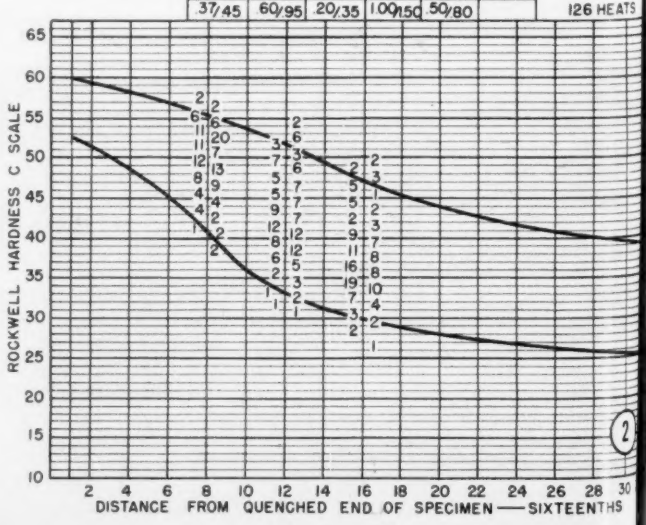
B. SHOWS FINISHED QUENCHED SPECIMEN AFTER GRINDING AND CHECKING ROCKWELL "C" HARDNESS.

1

HARDENABILITY BAND 3140H

C	MN	SI	NI	CR	MO
37/45	60/95	20/35	1.00/1.50	50/80	

126 HEATS



Most users who have worked a fair amount of steel purchased on the H-band basis, have become very tolerant of chemical out-of-specification heats provided hardenability is within the band

D STEELS at Treaters

By D. H. RUHNKE
Republic Steel Corp.
E. T. WALTON
Crucible Steel Co.
P. R. WRAY
Carnegie-Illinois Steel Corp.

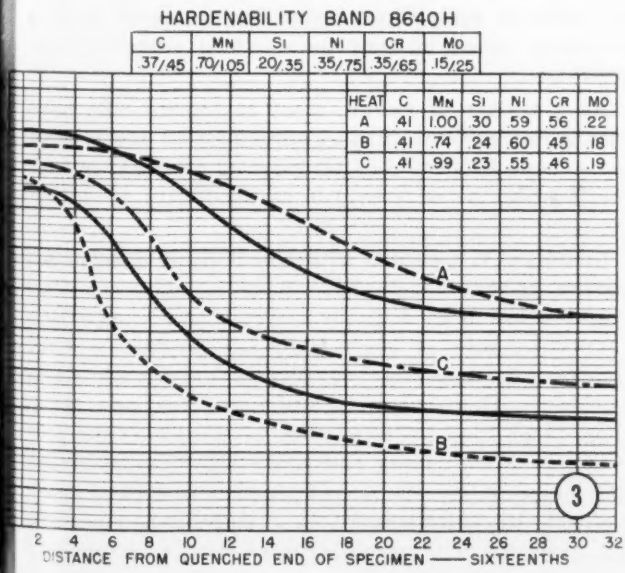
Development of Hardenability Bands and H Steels—Hardenability calculations and the end-quench test played such a vital part in the development of the National Emergency steels during World War II that American Iron and Steel Institute and Society of Automotive Engineers jointly decided to study the possibility of establishing hardenability specifications for alloy steels. As the result of these studies, a joint committee composed of representatives from the Technical Committee on Alloy Bars of the American Iron and Steel Institute and members of the Society of Automotive Engineers representing most of the large automotive, aircraft, and tractor manufacturers was formed in 1943 to formulate hardenability specifications for popular alloy steels. See STEEL, Nov. 1, p. 81.

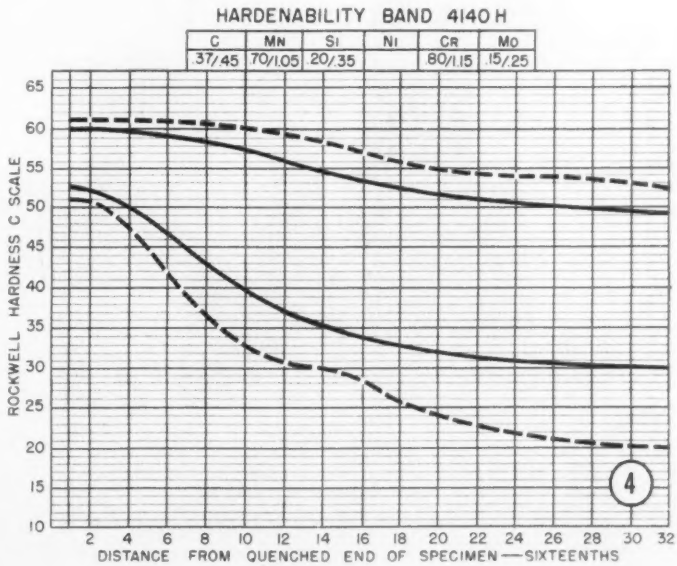
Details of the studies made by this group leading to publication of the first H-band steels are completely covered by John Mitchell in his paper "Progress Report on Hardenability Bands" in the 1945 year book of American Iron and Steel Institute. For the benefit of those who have not seen Mitchell's paper and to refresh the memories of others, some of the salient principles of this report will be repeated here.

Basis for establishing minimum and maximum hardenability limits, known as "hardenability bands" was that 93 per cent of heats made to the AISI-SAE standard chemistry specifications should be within the limits of such bands. In other words, these specifications were set up in such a way that approximately 3½ per cent of heats having highest hardenability and a like amount having the lowest hardenability would be discarded. Using this criterion, chemical analysis and hardenability results for several months' production of several grades of alloy steel were studied.

Fig. 5[3] illustrates a frequency distribution of hardenability as measured by DI (Ideal Diameter),[4] from which a hardenability band may be derived, for 112 heats of 8740 steel melted to the chemical specification with no effort to control hardenability. It is interesting to note that 19 out of the 112 heats or 16.9 per cent were out of the chemical specification, and had to be submitted to the ultimate user for acceptance, necessitating delays and often extensive tests before acceptance or possibly rejection for fear of heat treating difficulties. Observe that 16 out of those 19 out-of-specification heats (shown by black area) had hardenability well within the proposed hardenability specification limits while 4 heats that were within the chemical specification for all elements had hardenability outside of the proposed limits and would possibly have given trouble in heat treating.

This analysis of actual performance illustrates very clearly the need for hardenability specifications which would eliminate the small percentage of heats likely to give trouble in heat treating even though apparently satisfactory by the usual methods for judgment. At the same time, a much higher percentage of heats which fail to meet the chemical spe-

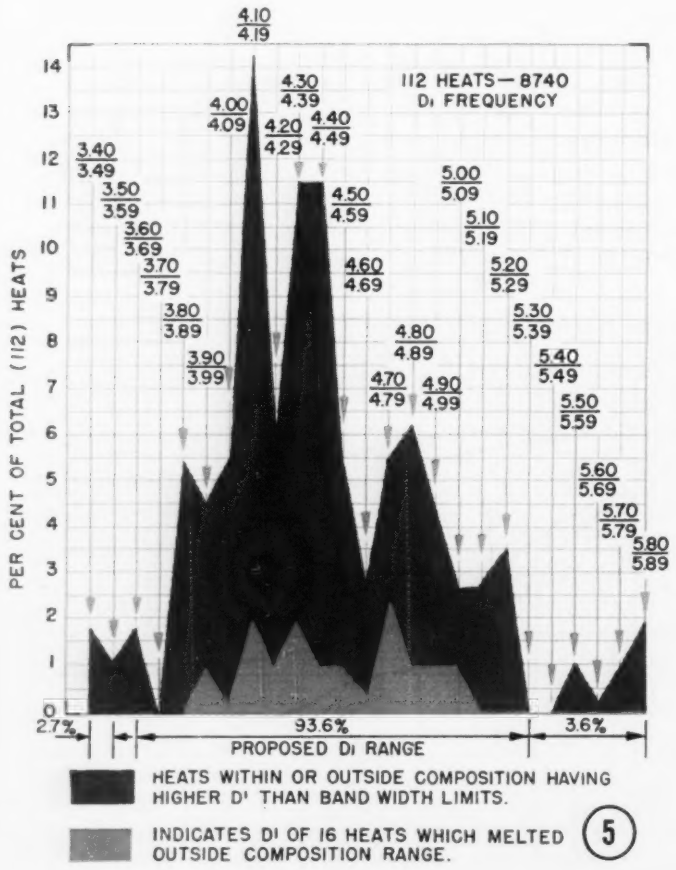



HARDENABILITY BAND 4140 H
C .37/.45
MN .70/1.05
SI .20/.35
NI
CR .80/1.15
MO .15/.25
ROCKWELL HARDNESS C SCALE
65 60 55 50 45 40 35 30 25 20 15 10
4
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32
DISTANCE FROM QUENCHED END OF SPECIMEN — SIXTEENTHS

cification in one or more elements yet which have satisfactory hardenability and which will probably perform as expected in production heat treating would not be questioned. Results of using H-band steels for production heat treating have verified the above predictions as will be discussed in another section of this paper.

Hardenability Control Offered—The first hardenability bands published were established by calculation methods, obtaining first DI limits, converting these to end-quench curves by the Field method[5] so as to include approximately 93 per cent of the results, and then adjusting the level of hardenability by comparison with actual end quench test results from production heats. Because of occasional unreliability in calculating hardenability from chemical composition, hardenability bands established during the past two years have been based on a statistical study of actual end quench hardenability tests from hundreds of production heats.

In addition to this, all the bands established prior to the last two years have been re-examined in the light of actual hardenability data gathered since their publication, and corrections made wherever the data indicated such a course was advisable. Fig. 2 is a typical example of the data used to establish the hardenability band for 3140-H. The distribution of hardness at each sixteenth along the test bar is plotted vertically and then approximately 3½ per cent of the high side values and a like percentage of the low values are discarded. This chart shows the improvement in hardenability control offered by the H-band specification, and also shows how the user is protected from receiving the occasional heat of steel that might crack due to excessive hardenability, also from the occasional heat so low in hardenability that it might not harden properly or might require special processing.



In formulating H-band steels, chemical ranges for the individual elements were made wider than those of the equivalent AISI-SAE standard steels for two reasons. The first was to allow the use of heats that were outside the customary AISI-SAE standard compositions but within the hardenability limits which were set up arbitrarily tighter than encountered in tight composition limits as shown in Fig. 2. Second reason for widening the chemical ranges was to allow the steel maker sufficient latitude to adjust his melting aim for individual elements like manganese or chromium which are added at the end of the heat to balance hardenability based on estimates of the heat hardenability when final melt analyses for composition are known.

Since there are many people who cannot understand how steel can be produced to narrower limits of hardenability with a wider spread of chemical composition, Fig. 3 has been prepared from actual data from heats made to standard chemical composition specifications to illustrate the principles that are involved.

Curve "A" is hardenability of a heat having all hardening elements on the high side of the H-composition range and above the top limit of the band; likewise, curve "B" having all hardening elements on the low side is below the bottom limit of the band. Curve "C" is a heat having all hardening elements except manganese on the low side, with manganese toward the top side—hardenability being well within the band, as desired. In working to an H-band specification, heat B would probably have been melted with a manganese aim toward the top side of the range, resulting in a heat similar to C.

Advantage of having a wider chemical composition range for the individual elements is that the melter can raise his aim for manganese and/or chromium above the mean if the preliminaries for nickel and/or molybdenum are low or he can lower his aim for manganese and/or chromium below the mean if the nickel and/or molybdenum are running high. Actually in melting an H-band heat of alloy steel, closer control of chemical composition must be exercised than is necessary when melting to standard chemical compositions.

As a matter of record, most customers who have used a fair amount of steel purchased on the H-band basis, have become very tolerant of chemical out-of-specification heats provided hardenability is within the band.

Customer Experience with the H-Band Steels—Although H-band steels have been in existence four years, it has been difficult to get a true comparison of performance of such steels in production heat treating as measured by former experience when working to chemical composition specifications. Many shops kept inadequate records of hardenability performance when buying standard steels to composition only. Also, many shops had standardized their processing to the point where they were having no hardening problems with steels (*Please turn to Page* 115)

Production, applications and physical properties of electrolytic manganese, chromium, tin-zinc alloys, tungsten alloys, electroformed iron and aluminum are discussed in some detail. Method for depositing corrosion-resistant nickel coatings on steel by chemical displacement from a hot chloride-boric acid solution also described

NEW DEVELOPMENTS IN Electrodeposition

. . . feature 94th Electrochemical Society meeting

WELL-ROUNDED agenda of technical papers in which were described many new developments in corrosion resistant coatings, alloy plating and the production of metals, featured the 94th convention of the Electrochemical Society, held in New York, Oct. 14-17. Highlight of the convention was an all-day technical session in which many new developments in electrodeposition were described. Symposia on batteries and the electrolytic production of metals, plus a general technical session presided over by the president of the society, James A. Lee, were also major attractions of the meeting.

Corrosion Resistant Coatings—Simple method for depositing corrosion-resistant nickel coatings on steel by chemical displacement from a hot nickel chloride-boric acid solution was described by W. A. Wesley, research laboratory, International Nickel Co., Bayonne, N. J., before the electrodeposition symposium of the convention. Suitable heat treatment of these immersion deposits renders them compact and adherent, and results in diffusion of the nickel and iron to give a corrosion resistant surface which provides a good base for other coatings, such as organic finishes, conversion coatings, and ceramic enamels.

Thickness of the nickel coating increases with the time of immersion. According to data presented by Dr. Wesley, experience gained by coating over 850 pieces of 13 heats of steel indicates the order of thickness with time as shown graphically in Fig. 1. For deposition of nickel to occur, iron, equivalent to the amount of nickel displaced, must dissolve in the solution as ferrous iron. This then becomes oxidized to ferric iron and is precipitated as ferric hydroxide. In order to maintain a constant pH, the hydrochloric acid thus liberated must be neutralized. To maintain a minimum porosity in the nickel coating, the precipitate must be removed. Motion of the parts to be coated is desirable, but not necessary. The follow-

Fig. 1—Thickness of immersion nickel coatings on steel expressed as a function of time of treatment in a modified nickel chloride solution

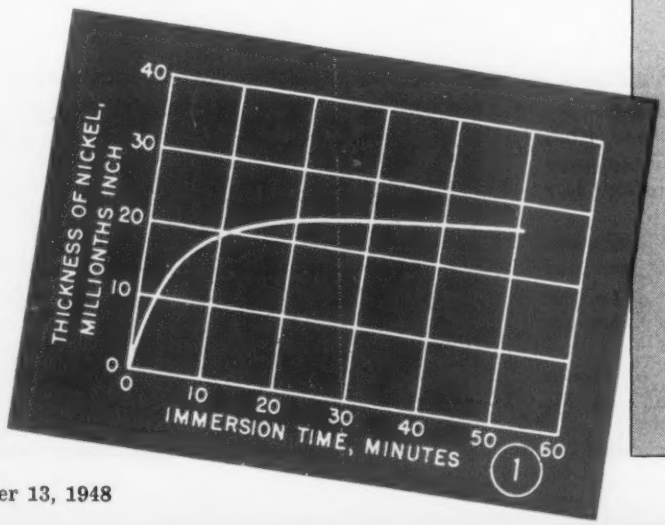
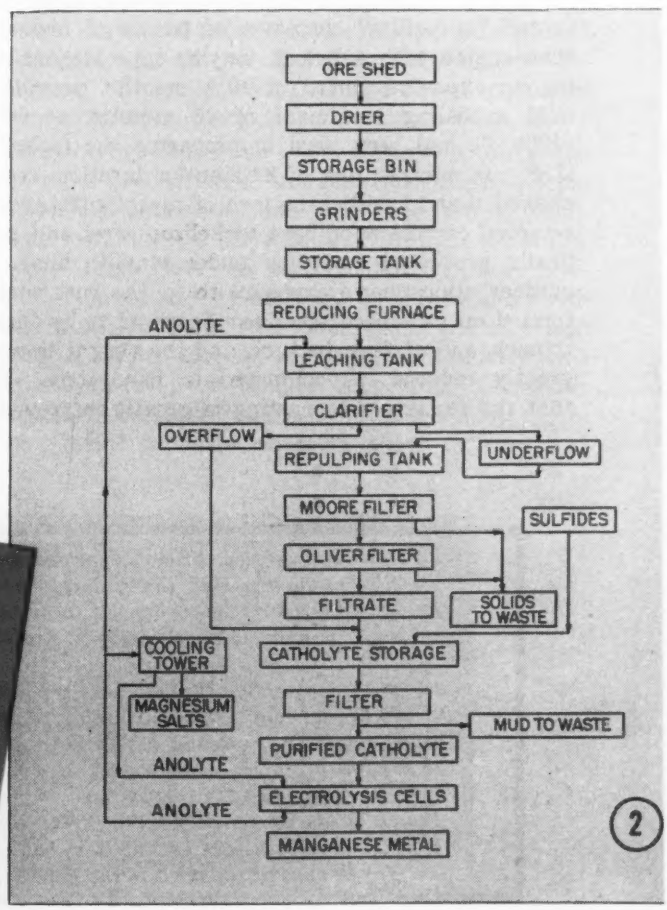


Fig. 2—Process flow sheet for production of electrolytic manganese



ing bath composition was recommended for application of the immersion coating:

Nickel chloride	600 g.p.l. (80 oz./gal.)
Boric acid	30 g.p.l. (4 oz./gal.)
pH	3.5 to 4.5
Temperature	70°C. (160°F.)
Cathode agitation	desirable but not required

Heat Treatment of Coatings — A high-temperature treatment in a reducing atmosphere serves to sinter the nickel coating, to decrease porosity, and to increase adhesion. Wesley reported that it is possible to detect improvement in these respects after heating at 600°C (1100°F) for as short a time as 30 minutes. The annealing treatment gives the surface of the nickel coating a white matte appearance. A metallographic cross-section through a typical immersion coating after a mild 30-minute anneal at 6500°C (1200°F) is shown in Fig. 3. It was emphasized that a relatively mild treatment is desirable for some types of use, whereas for others, a long time at a temperature as high as 760°C (1400°F) is preferable.

On severely bending a specimen of coated steel after heat treatment, the surface alloy layer is observed to crack but not flake off. This effect is illustrated in Fig. 5 for a coating which has been annealed in hydrogen at 650°C (1200°F) for 45 minutes. On the inside of the bends, the coating followed the folds in the steel surface.

Base for Organic Coatings—Indications that nickelized steel may have merit as a base for organic coatings is based on data given by Wesley, which was obtained in tests involving exposure in a constant-temperature, constant-humidity room. Under these conditions, as little as 7 millionths inch of nickel prevented "underfilm" corrosion of panels of nickelized steel coated with a baked, vinylite-type lacquer during an exposure period of 10½ months, provided a mild annealing treatment of 45 minutes at 650°C (1200°F) had been used in preparing the nickelized steel. In another test of 22 months duration, results showed that 14 millionths inch of nickel substantially retarded corrosion of bare nickelized steel and practically prevented corrosion under vinylite films. In outdoor atmospheric exposure tests, the rust coating formed on nickelized steel was observed to be darker, thinner, and of finer texture, and the weight loss was greatly reduced, as compared to bare steel. Fact that the resistance to rusting is greatly improved by heat treatment suggests that there is diffusion, not only in a direction normal to the steel-nickel interface, but also in a lateral direction, leading to some alloying of the previously bare anodic spots.

Electrolytic Manganese—High-purity (99.9 + per cent) electromanganese, made by the electrolytic process, has firmly established its advantages by use in a wide variety of metallurgical operations, according to C. L. Mantell, consulting chemical engineer, in discussing the commercial production of electrolytic manganese before the convention session on electrolytic production of metals. Absence of impurities gives the nonferrous and ferrous metallurgist an alloying element which not only secures uniform results, but also, in many instances, produces improved mechanical properties. Manganese metal of this purity has further made possible the development of a number of new high-manganese alloys, as well as an entirely new field of manganese base alloys.

Manganese is an important constituent in alloys of aluminum, copper, iron, magnesium and zinc, as well as more complex systems involving these metals. Manganese additions to brasses, bronzes, and nickel-silvers have received considerable attention. The element finds wide application as a scavenger, deoxidizer, and degasifier in specialty alloys for high temperature service as those of nickel-chromium and nickel-chromium-iron, in strip steels, and a wide variety of stainless steels and irons of the manganese-chromium-iron, the manganese-chromium-nickel-iron, and other alloys.

Based on information supplied by Mantell, the binary alloy systems of manganese which have been studied cover a wide range, but it was pointed out that much of the work was done with impure manganese before the availability of pure electromanganese. Ductile alloys may be made from electromanganese by alloying with oxide-free aluminum 0.1 to 5.0 per cent, nickel from 2 to 10 per cent and copper 3 to 16 per cent. Cold workable alloys have been proposed of at least 50 per cent pure manganese with 0.1 to 10 per cent aluminum, 0.5 to 10 per cent nickel, and 1 to 35 per cent copper.

Electrolytic manganese, of which some 20 million pounds have been produced and consumed, is the product of an electrowinning operation. The manganese value is extracted from manganese ores using a sulphuric acid leaching solution, which is an an-

Fig. 3—Cross section through annealed nickel deposit 30 millionths inch thick; 2 per cent nital, 1500X. (A) Heavy nickel deposit to protect edge of cross section, (B) immersion deposit, (C) steel base

Fig. 5—Cross section through bent annealed nickel deposit 14 millionths inch thick; 2 per cent nital, 1500X. (A) Heavy nickel deposit to protect edge of cross section, (B) immersion deposit, (C) steel base

Fig. 6—This curve shows the effect of changing the tungsten content of the bath on the amount of tungsten in the deposit

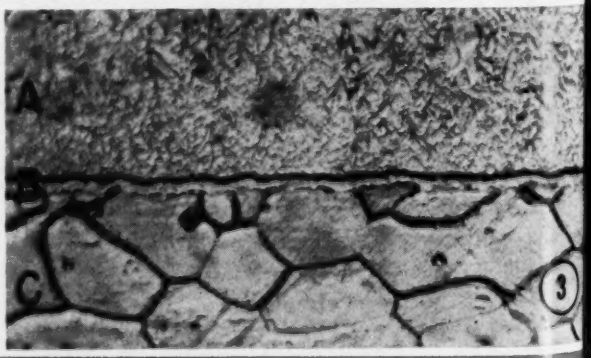


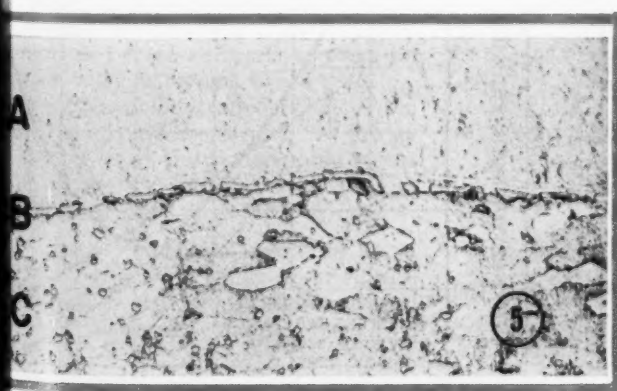
Fig. 4—Cell room for producing electromanganese. Courtesy Electromanganese Corp.

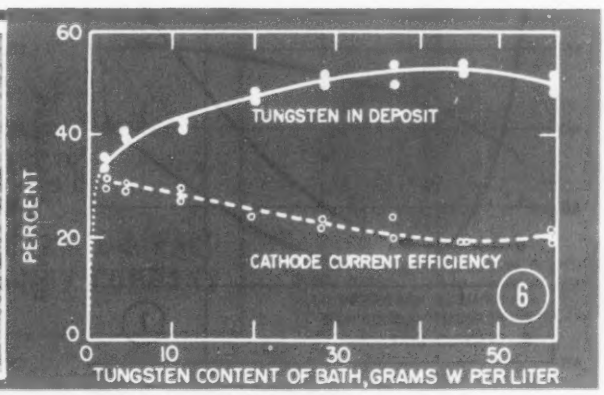
olyte from the electrolytic cells. Flow sheet for the process is shown in Fig. 2, and a portion of the cell room for production of electrolytic manganese is shown in Fig. 4. Manganese metal of high purity may be made by electrowinning in contrast to the special ore requirements for electric furnace processes producing less pure manganese metal.

The leach solution, after increase in manganese content and decrease in acid, is carefully purified, and after adjustment becomes the feed liquor to the deposition cell where insoluble anodes are employed. The feed liquor enters the catholyte chamber of a two-compartment diaphragm cell where the manganese content of the feed is stripped, the solution passing through the diaphragm to become part of the anolyte. Anolyte returns in circuit to leach fresh conditioned ores and the cycle is thus continuous.

In another study, reported at the convention, on electrowinning of manganese conducted in the laboratories of the Bureau of Mines, Boulder City, Nev., J. H. Jacobs and P. E. Churchward of the bureau reported that electrowinning from a chloride electrolyte is feasible. A comparison of the chloride process and the present-day sulphate process was made. Although a lower cell voltage is required for the chloride process, certain disadvantages are encountered such as corrosiveness of the chloride solution and the requirement of ventilation to remove obnoxious fumes produced at the anodes.

Electrolytic Chromium — Procedures used in the pilot-plant production of electrolytic chromium from substandard chromium ores were described by R. R. Lloyd, metallurgical division, U. S. Bureau of Mines, Boulder City, Nev. It was pointed out that electrolytic chromium, which compares favorably with metal produced from the conventional chromic acid plating solution, may be deposited continuously at a current efficiency of 60 per cent from a chromic sulphate electrolyte produced by a leaching procedure. Metal produced contains about 0.5 per cent





iron, but the iron can be varied from almost nothing to 9 per cent.

It was reported that about 10,000 pounds of metal have been produced. Chromic sulphate liquor prepared by direct dissolution of chromite in sulphuric acid contains quantities of iron, aluminum and magnesium; minor quantities of calcium, titanium and manganese, as well as accumulative traces of vanadium, nickel, copper, cobalt and molybdenum. Procedures are available for the separation of most of these metals from the chromic sulphate to make a suitable electrolyte for electrowinning and metal production.

Electroplated Tin-Zinc Alloys — Properties and uses of electroplated tin-zinc alloys on metal products was discussed at the electrodeposition session by J. W. Cuthbertson, Tin Research Institute, Middlesex, England, where it was pointed out that the 78 per cent tin alloy is being increasingly used as an alternative to cadmium plate. The tin-zinc plate can be passivated by immersion in hot 2 per cent chromic acid solution which further increases resistance to corrosion and reduces any tendency toward finger-marking. It was emphasized that, whereas tin and zinc can be codeposited in all proportions from the solutions described, the electrodeposition of alloys containing less than 78 per cent tin diminishes the corrosion resistance of the plate, but not seriously until the tin content falls below 50 per cent. Electrodeposition of alloys containing less than 50 per cent tin presents greatly increased operating difficulties and it was pointed out that it is probably more economical to apply these coatings by hot-dipping.

Based on information supplied by Cuthbertson, the electrical industry is the chief user of the tin-zinc plate, and is turning to the 80 per cent tin alloy as an alternative to cadmium for the protection of radio chassis, loud speaker frames, valve screens and other components. Since the plate stands up well to marine atmospheres, it is finding some uses in the protection of ship fittings. It was also suggested that tin-zinc coated steel may prove useful for the manufacture of certain containers. Hardness of tin-zinc plate containing 80 per cent tin was given as 37 on the Vickers scale. The tin-zinc plate was described as extremely ductile; mechanical deformation of tin-zinc plated steel, for example, by bending does not rupture the coating or seriously reduce its protective value. Being harder than tin, it was pointed out that the alloy plate can be readily polished to a high luster.

With regard to bath operating data, Cuthbertson pointed out that tin and zinc can be co-deposited in all proportions from solutions containing sodium stannate, sodium hydroxide, sodium zinc cyanide, and free sodium cyanide, operated at 65°C and at a cathode current density, for still solutions, of 10-30 amperes per square foot, using alloy anodes of the same composition as the alloy to be deposited. Tin content of the solution is maintained at 30 grams per liter and the free cyanide at 17.5-20.0 grams per liter throughout. Composition of the deposit is adjusted by varying the amounts of zinc, total cyanide and sodium hydroxide. Most serviceable composition, from the viewpoint of the protection afforded to steel, was stated to be around 78 per cent tin 22 per cent zinc, where it was reported that plate of this composition, not less than 0.0003-inch thick, is superior in protective value to either cadmium or zinc plate of comparable thickness, and in addition is very easy to solder.

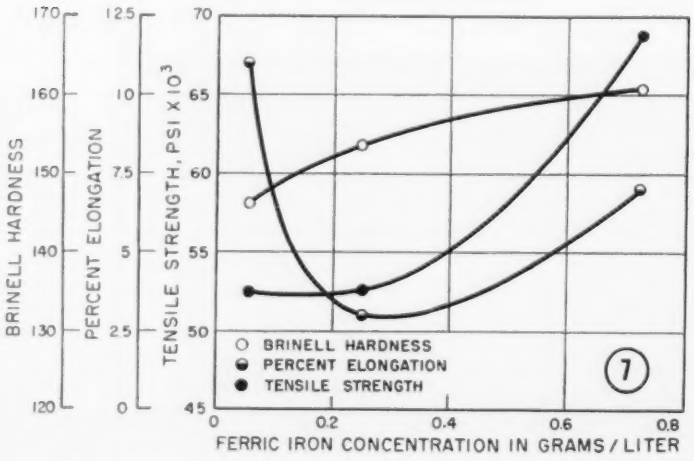
Electroplated Tungsten - Alloys — Procedures for electroposition of alloys of tungsten-iron and tungsten-cobalt were described by Holt of the University of Wisconsin. Principal interest in these electrodeposited alloys arises from their possible application where hardness, particularly at elevated temperatures, is required. It has been pointed out that they may be competitive with chromium and hard nickel for building up worn parts or for use in dies.

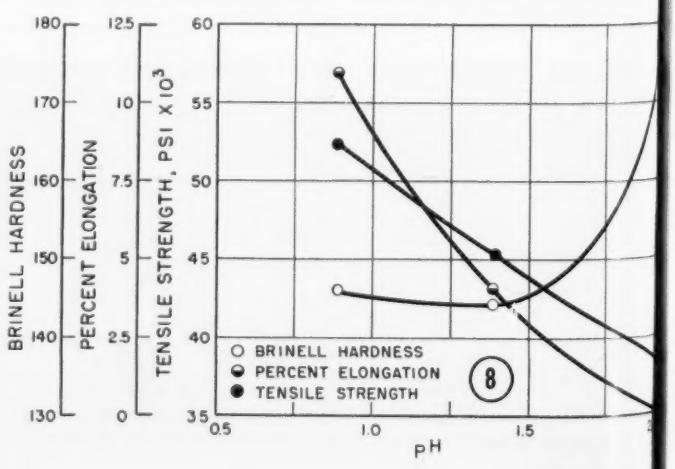
Plating bath recommended by Holt for depositing tungsten-cobalt alloys consists of cabalt as $COSO_4 \cdot 7H_2O$, 12.6 g./L.; tungsten, as $Na_2WO_4 \cdot 2H_2O$, 39.3 g./L.; citric acid, 66 g./L.; and ammonium hydroxide to pH 7. It was recommended that this bath be operated at 70° to 90°C., and at a cathode current density of 2 to 12 amp./sq. dm. Effect of changing the tungsten content of the bath on the composition of the deposit produced is shown in Fig. 6. Cathode deposit obtained from this bath at 12 amp. / sq dm contains about 50 per cent tungsten. Plates are quite bright and show no tendency to tarnish. It was pointed out that plates obtained at lower current densities seem to have greater mechanical strength, although they contain slightly less tungsten.

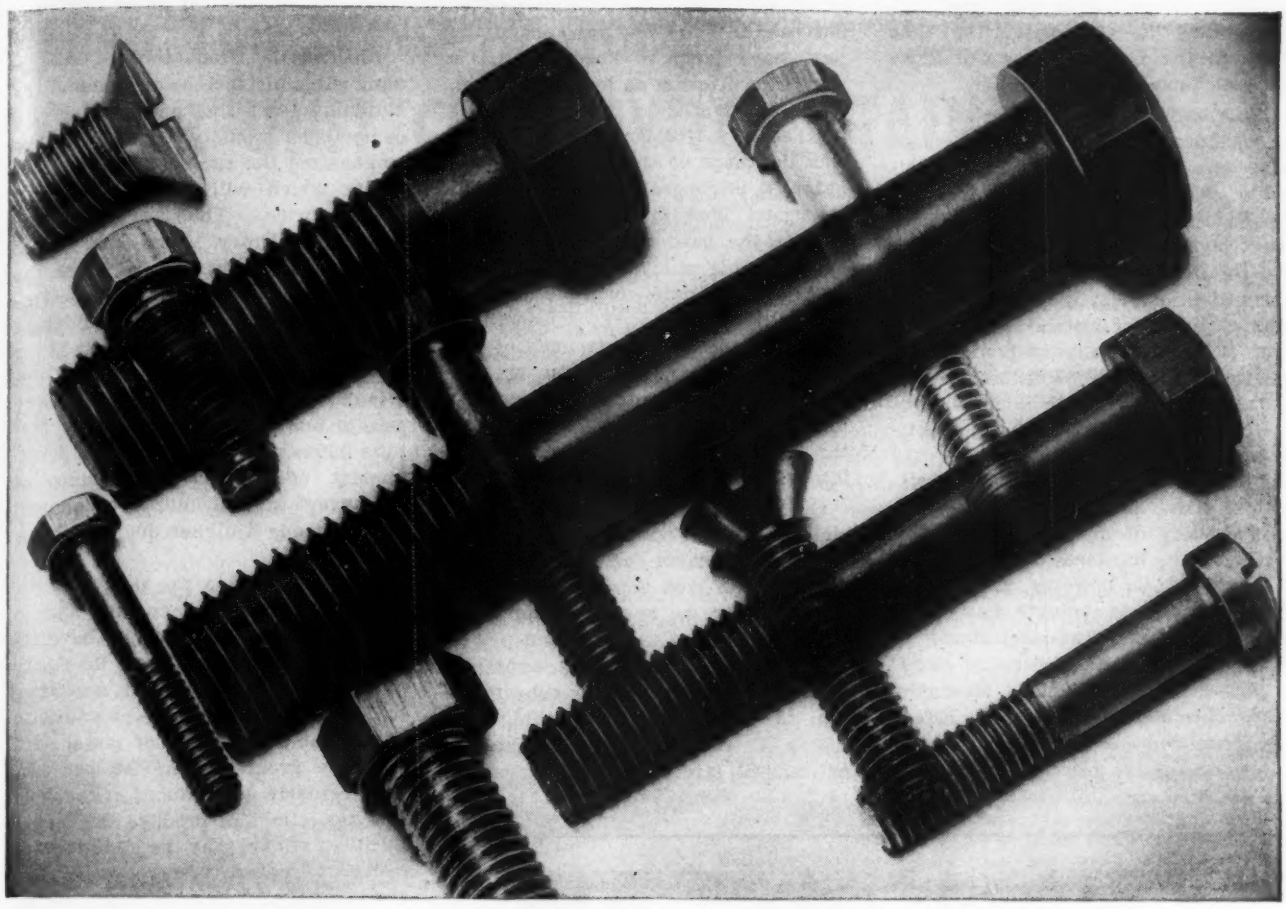
Properties of Electroformed Iron— Electroforming operations are finding a definite place among the metal working methods used in industry today. In a paper prepared for presentation before the society, by I. Larson, R. W. Moulton, and G. L. Putnam, University of Washington, Seattle, some of the physical properties of electrolytic iron that are of interest in electroforming processes were brought out. Throughout this

Fig. 7—Physical properties of deposited iron are important in many electroforming operations. Shown here is the effect of ferric-iron concentration on properties of electroformed iron plate, using a modified ferrous chloride electrolyte

Fig. 8—Effect of pH on physical properties of iron deposited from the chloride-type bath







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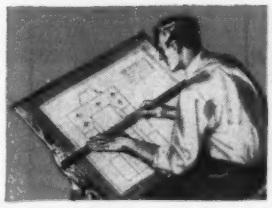

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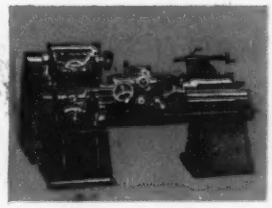

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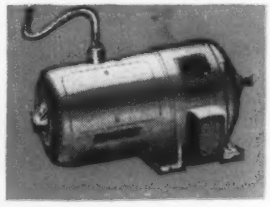

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study a chloride bath was used, corresponding in composition to that used in the U. S. Rubber Co. Ekko process for electroforming.

This bath contained 100 ± 15 g./L. of technical ferrous iron as the chloride and 100 ± 5 g./L. technical calcium chloride. For small variations in concentrations, the properties of electrolytic iron are not a function of calcium chloride or ferrous chloride concentrations. It is recognized that one of the most critical variables in the electrodeposition of iron is the purity of the bath. Purification was carried out by boiling with electrolytic iron and filtering through activated carbon.

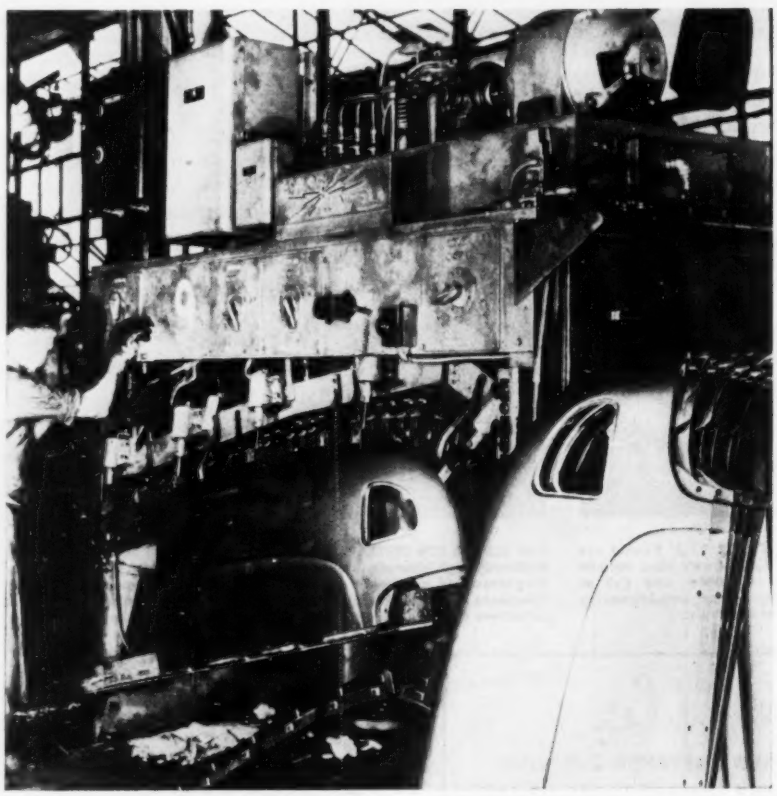
Results reported from the investigation show that increasing the current density of deposition had little effect on the hardness of the electroformed deposit; however, a slight reduction in tensile strength was noted. Tensile strength was also found to be related to temperature of deposition, the highest tensile strengths being obtained at about 97°C. Effect of ferric-iron concentration on the properties of the electroformed plate is shown in Fig. 7. It was pointed out that most of the workers in the past have tried to keep the ferric iron concentration as low as possible, but it was stated by the authors that in the U. S. Rubber process, which was the basis of the method investigated, it is generally considered that moderate concentrations of ferric iron in the bath are desirable. Results of this study showed that increasing the ferric iron concentration from 0.04 to 0.72 g./L. considerably increased the tensile strength of the deposit. Data collected also showed a better combination of tensile strength and elongation by increasing the ferric iron concentartion to at least 0.72 g./L.

Of the variables investigated, changes in pH produced the most pronounced effect on the physical properties of iron deposited from the chloride bath, as is shown graphically in Fig. 8. At the optimum pH of 0.6 to 0.9, it was brought out that increasing the ferric iron concentration to a value at least as high as 0.72 g./L. gave a better combination of tensile strength and elongation than was obtained at lower ferric-ion concentrations.

Electrolytic Production of Aluminum—Steadily increasing demand for aluminum and the sharpness of its competition with other metals have emphasized the necessity of improvements which will reduce costs and selling price. Thus, according to Francis C. Frary, Aluminum Co. of America, in discussing some of the present-day problems in the electrolytic production of aluminum, much of the modern market demand is for alloys which have to be made of aluminum of a purity commercially rare or unavailable 25 years ago. This puts increasing pressure on the development of improved techniques of producing and handling the metal and demands a higher quality of raw materials.

Improvements in the purity of the alumina and carbon anodes, and in the technique of electrolysis have resulted in steady increases in purity of the aluminum produced, according to Frary. With suitable precautions, considerable quantities of metal with a purity greater than 99.8 per cent can regularly be produced in the electrolytic cells. To produce the higher purities, which may be required for special purposes, the three-layer electrolytic refining process has been operated both here and abroad.

In essence this process consists of increasing the specific gravity of the cryolite bath, by the addition of barium and calcium salts, to about 2.8, so that pure aluminum will float on the surface of the bath, and using an anode, beneath the molten bath layer, an aluminum-copper alloy containing enough copper to make it considerably heavier than the bath. Aluminum is electrolytically dissolved from the molten anode and deposited upon the floating molten pure aluminum cathode. From time to time, refined metal is removed from the cathode and additional commercial aluminum added to the anode alloy. It was pointed out that considerable tonnages of metal having a purity of over 99.99 per cent have been made by this process both here and abroad. Thus, Frary emphasized that active developments in reducing costs and improving purity of product are going on all over the world in this young and vigorous metal industry, and the results will steadily improve the competitive position of aluminum in modern metals technology.



FENDER WELDER: Air-operated clamps hold fenders to correct body contour over inner welding electrodes with this special welder made by Taylor-Winfield Corp., Warren, O., for Hudson Motor Car Co., Detroit. Selector control switch makes possible the running of right and left hand fenders or only fenders of one side without loss of production time. Based on 100 per cent efficiency, machine can produce 250 assemblies per hour

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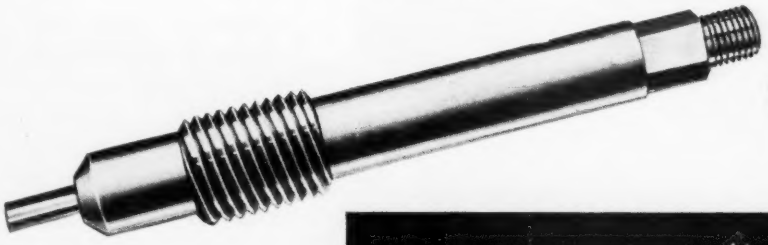

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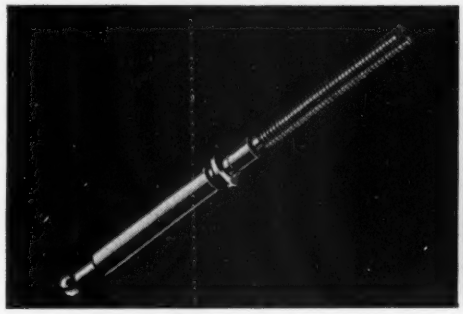

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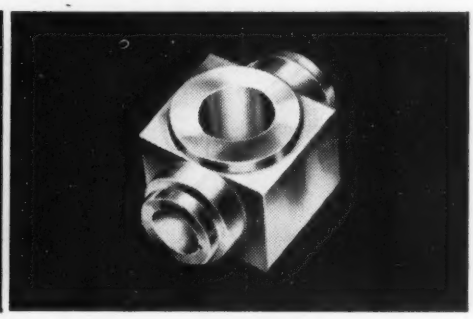

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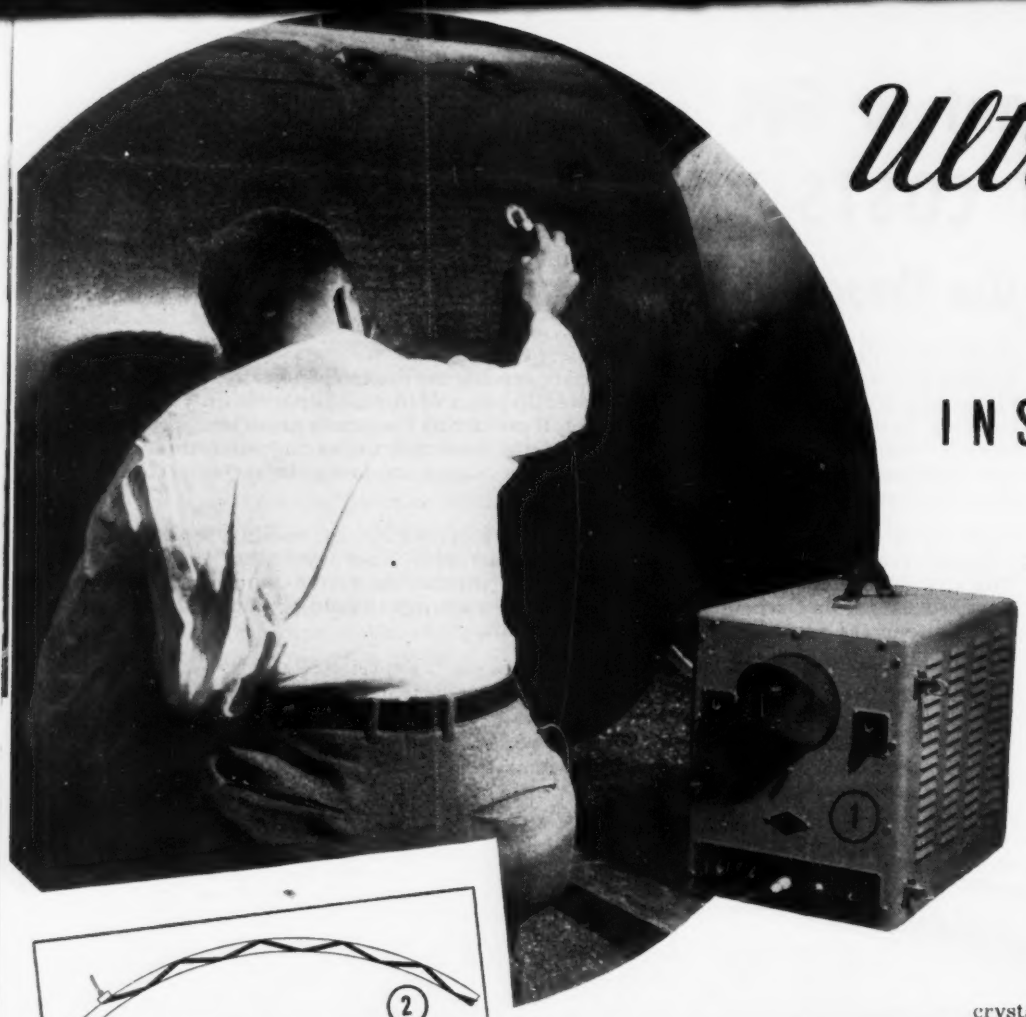

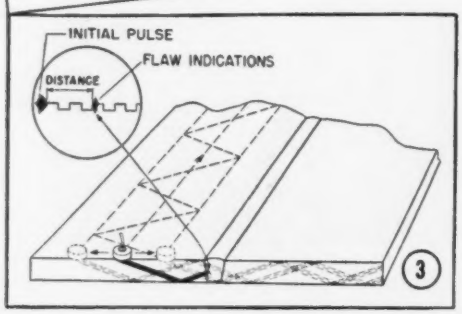

NONDESTRUCTIVE inspection and testing of steel and nonferrous metals with new standard reflectoscope equipment is broadened by development of an ultrasonic angle searching unit by Sperry Products Inc., Danbury, Conn., for testing of welds. Employing high frequency sound waves generated by an ultrasonic reflectoscope, this searching instrument by angle beam transmission makes possible entrance of sound beams into welded sections at an angle. Placed on parent metal adjacent to the weld, or within 3 to 6 inches of the weld, angle searching unit tests welds for lack of bond, inclusions or voids, Fig. 2.

Primary unit element is a quartz crystal, energy traveling by successive reflections between metal surfaces until a discontinuity is reached. The weld metal itself does not constitute a reflecting interface, but voids or inclusions will reflect part of a sound beam back to the searching unit where it is amplified to provide a vertical deflection of a horizontal trace on an oscilloscope screen, Fig. 3. Accurate calibration to determine distance from searching unit to flaw is obtained with a time marking system, making it possible to distinguish between any defects in plate or parent metal and those in the weld area.

By controlling sensitivity of the instrument, defects or voids too small to affect efficiency of welds may be by-passed, although it is possible to locate smaller defects and at greater depths than with other nondestructive testing equipment. In aluminum and magnesium, ultrasonic waves travel equally well as in steel, and welds in plate or sheet stock of those materials are also inspected. Depth of penetration is comparable to that in steel and defects of same minute size may be located.

As with standard searching units, varying frequencies require crystals of different thicknesses in the angle instrument for standard test frequencies of ½, 1, 2¼-megacycles. During

Fig. 1—Testing tank weld with reflectoscope equipped with angle searching unit

Fig. 2—Angle searching units direct sound beam into metal in such a manner that reflections from the opposite side are not received

Fig. 3—Paths of sound beam when scanning weld area for discontinuities. Center beam is intercepted by the defect and its distance from the crystal is indicated on the oscilloscope screen. Broken lines on surface indicate directions in which the crystal ordinarily moves

Fig. 4—Sketch of wall section of tank or pressure vessel showing how beam follows curvature and travels without interference through good material and good weld area

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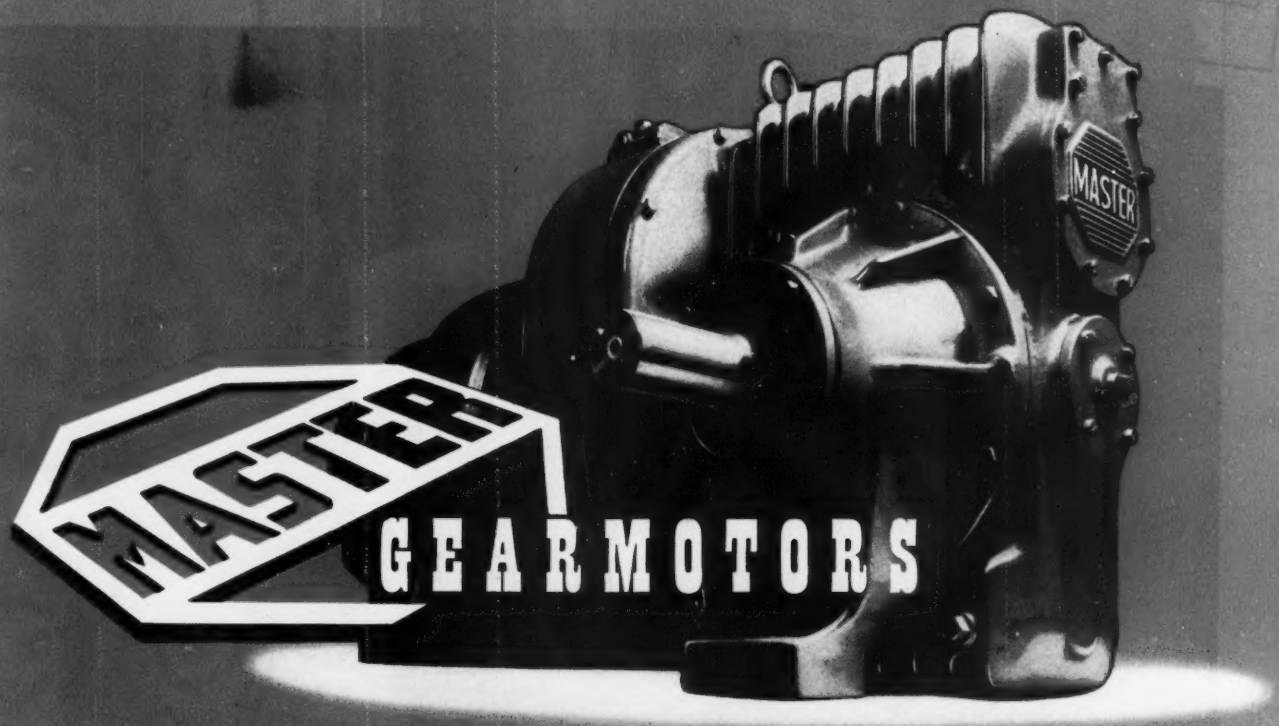

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tests, angle and straight searching units are interchangeable, and inspection problems are frequently better solved by alternating type of crystal and comparing indications. Quartz crystals are ½ or 1-inch square, mounted in a compact metal holder with a plastic face.

Principle of operation is not complicated. Ultrasonic vibrations are transmitted angularly into metal being tested and the sound beam is normally reflected away from its point or origin in the searching unit. Any discontinuities in material in path of the sound beam interrupt transmission, reflect sound back, and give a visual indication of presence and location on an oscilloscope screen. Welds in plates, sheets and other sections with shape and contour more or less uniform may be inspected, including tank walls, pressure vessels, tapered blades, ship plate and pipe, as examples, Fig. 4. Electric, pressure and rod welds are all satisfactorily inspected by this ultrasonic method. If weld surface is relatively uniform, seam, groove and bevel welds may be tested.

Before weld tests, depending on plate thickness, a 2 or 3-inch strip parallel to the weld and 3 to 6 inches from it is cleaned. Angle searching unit is placed on this area and aimed directly at the weld line. As the searching unit is moved parallel to weld the ultrasonic beam is projected through both plate and weld. Since dimension of the angle testing beam is approximately equal to area of crystal, this beam covers entire interior of plate or section whose thickness is equal or less than crystal width, Fig. 5.

To insure complete coverage of weld area for sections thicker than the crystal width, the searching unit is moved back and forth through a path approximately equal to plate thickness. Plate welds from extremely thin sections to thickness of 4 to 5 inches are angle-tested for proper fusion, thus bringing tanks and pressure vessels as well as other fabricated parts into the sphere of ultrasonic testing.

Steel and nonferrous metals are also angle-tested for internal defects prior to welding, operating against costly fabrication of defective material. Fans and tapered sections are angle-tested ultrasonically for internal defects. A gas booster fan, one-piece forging with 23 blades, is suc-

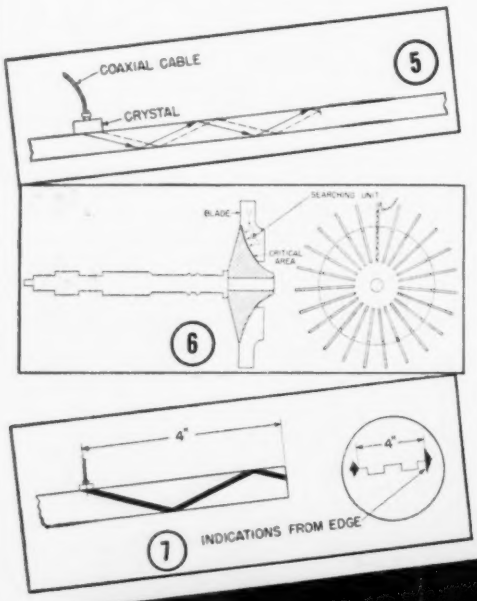


Fig. 5—Path of sound beam and its reflection from an internal defect in plate is visualized here

Fig. 6—Gas booster fan, a one-piece forging, was successfully tested supersonically with angle searching units. Each of the 23 blades was searched; cracks were located in four blades in or near blade roots. Arrows indicate directions in which searching unit was aimed

Fig. 7—Calibrating reflectoscope to measure distance from angle searching unit to the defect

Fig. 8—Testing stud bolts

cessfully tested ultrasonically with angle searching units, Fig. 6. In one case cracks were located in four blades at the blade roots. Pipe, tubing and bar stock are also inspected for certain types of defects, and small-diameter tubing may be tested from ends as well as walls. Bar stock generally is examined by straight testing from the ends, but an angle unit can be used if ends are not accessible.

Accurate calibration of defective weld locations is accomplished with an angle searching unit in much the same way similar results are obtained by straight testing methods. Searching unit is placed on the surface of a sample piece of metal similar in analysis to that to be tested 3 to 6 inches from sample edge, Fig. 7.

Thickness Not Important Factor

Inch markers on the oscilloscope screen are adjusted to that number of inch marks between indications on the screen equal distance in inches from searching unit to the sample edge. Thickness of material is not a factor in calibrating, as linear distance, as indicated on the oscilloscope screen, is same regardless of thickness. With this method, internal defects outside weld areas in plate, sheet steel or other parts can be located as to distance from the searching unit.

Paralleling development of the searching unit are radical improvements in design and specifications covering a new ultrasonic reflectoscope by Sperry Products Inc. Specifications of the new instrument match those of models now in wide usage, but radical changes have been made in size, appearance and operation. Elimination of waste air space and a complete redesign of circuits are responsible for decreased weight and bulk of the type SRO5 Reflectoscope. The type SRO5 is approximately 14 x 16 x 23-inches, and is carried by means of handles on the case, eliminating wheeled carriage which supported older instruments. Over-all weight is approximately 85 pounds or about half previous weight. Cost has been reduced materially.

Sensitivity remains the same, but operation has been considerably simplified by reducing the number of external controls to five. With these controls the operator varies sensitivity, pulse width, sweep length, screen markers and frequency. Visual indication of internal defects remains unchanged on the oscilloscope screen, but the tube is a smaller, 5-inch, high-intensity type.

This simplified model not only facilitates testing of manufactured products from raw material to finished stage, but the increased portability inherent in the new design makes it particularly valuable for field testing welds in tanks, pipe and various structures and for locating fatigue cracks in assembled plant equipment.

—o—

Ramie, one of the world's oldest vegetable fibers, is being made into packing for reciprocating pumps by United States Rubber Co., New York.

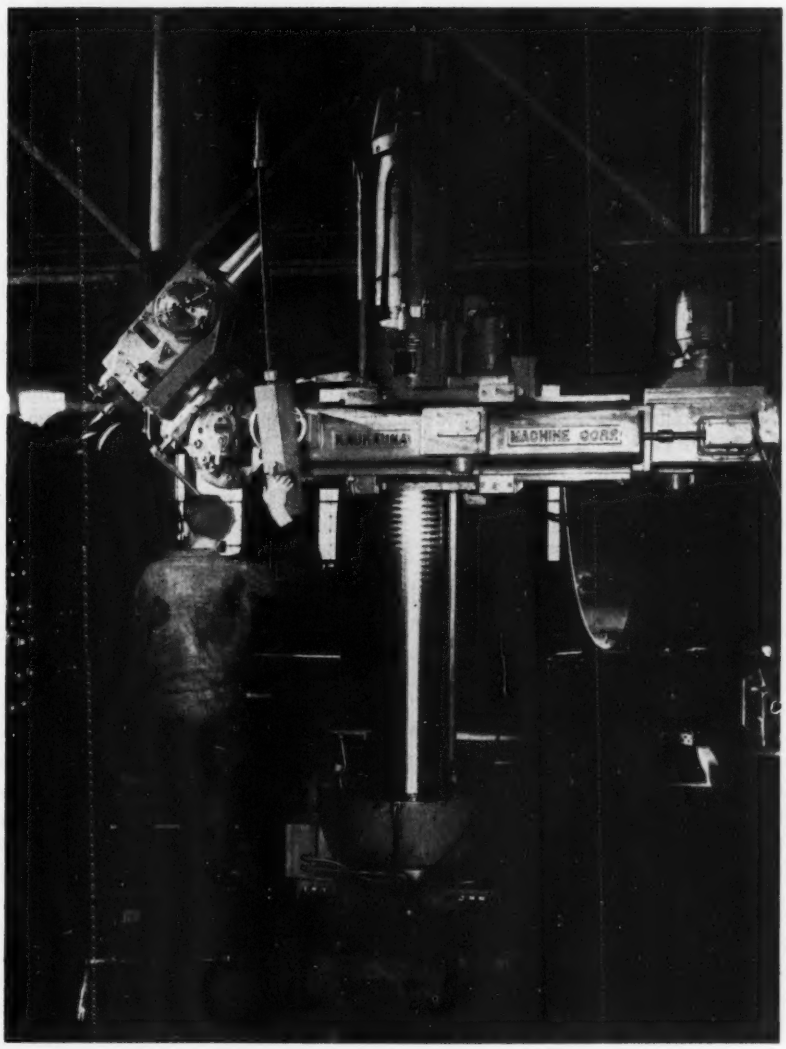
BOILER DRILLING AND TAPPING

. . . performed by portable machine

DIFFICULTIES formerly encountered in drilling and tapping check valve and wash out plug holes in a large partially assembled locomotive boiler were overcome by using a portable drilling and tapping machine made by Kaukauna Machine Corp., Kaukauna, Wis. As shown in the accompanying illustration the machine is placed into position next to the boiler by means of an overhead crane hooking on to the lifting bail on top of the column.

Hinged spreader arms and wide base flanges give machine ample rigidity to do its work regardless of floor conditions. Swiveling movements of the head and column rotation permit fast and accurate squaring of spindle to the workpiece without leveling machine or piece.

Time for drilling the 2¾-inch holes was approximately 4 minutes, including drilling the 1-inch pilot holes and changing the drills. An air motor used in the past required two or three men and approximately twice the time to drill the holes. The portable drilling machine also eliminates the need for additional work prior to tapping that was often necessary.



Oxygen Speeds Output of

ELECTRIC FURNACE STAINLESS STEELS

Improvement in quality of alloy and straight chrome grades of stainless steel, savings in cost and increased production in tons per operating hour result from oxygen blow practice. Resume of sixth electric furnace steel conference in Pittsburgh

ELECTRIC leads of the secondary voltage of an electric arc steel furnace hookup carrying 440 volts are more dangerous than the 2200-volt lines found in steel plants and this hazard should be stamped indelibly on the minds of electric furnacemen. This fact was one of many stressed by F. W. Brooke, vice president, Swindell-Dressler Corp., Pittsburgh, at the opening session of the sixth annual Electric Furnace Conference. The meeting sponsored by the Electric Furnace Committee of the Iron and Steel Division, American Institute of Mining and Metallurgical Engineers, was held at Hotel William Penn, Pittsburgh, Dec. 2-4.

Mr. Brooke warned that a limit switch in the melt shop also is a hazard pointing out that this device usually is neglected and susceptible to dirt and stickiness. He advocated a regular period of inspection. He suggested that the transformer room should be locked and only an authorized person be permitted to have a key thereto. In discussing circuit breakers, the speaker pointed out that this device had to make and break as many as 53,000 times a year and he mentioned that breakers now were designed to stay in service for a period based on a production of 1000 tons of steel per year.

At the Friday afternoon session devoted to the theme of oxygen in steelmaking (basic practice), A. C. Ogan, assistant superintendent, Electric Furnace Department, Duquesne Works, Carnegie-Illinois Steel Corp., Duquesne, Pa., described the manufacture of stainless steels in his shop where two 35-ton and one 70-ton furnaces are operated.

Oxygen is piped to the furnaces from the plant system through a 3-inch line. A 2-inch line transmits the oxygen from the main, direct to the furnaces, at approximately 110 pounds pressure at the valve. Oxygen is fed into the bath at the slag-metal interface by means of a ½-inch inside diameter oxygen lance covered with plastic refractory and wrapped with burlap strips. The coated lances are inserted into the wicket holes of the doors and connected to the 2-inch line by 1-inch oxygen hose. The rate of input as measured by an impulse flow meter is approximately 10,000 to 12,000 cubic feet per hour per furnace, using a ½-inch lance.

High silicon scrap is charged at Duquesne to make up the portion of the charge that is not stainless. Some ore or cinder is added with the initial charge or back charge, and the oxygen blow is started when the bath is about three-quarters melted. The ore added with the charge is beneficial in starting the oxidation of the silicon and manganese during the early stages of the melt-down and provides as cheap a source of iron as can be obtained at today's high scrap prices.

The oxygen blow is started before the heat is all melted and often the electrodes are raised and the melting completed with the exothermic heat of the oxygen reaction. The reaction of the oxygen and the silicon in the bath develops sufficient heat to quickly raise the temperature of the molten bath to above that required to provide a reduction in carbon content in preference to the formation of chrome oxide, even though unmelted scrap remains around the banks. As a result, the carbon elimination is already well under way by the time the bath is completely melted and the additional time required to reduce the carbon content to 0.04 or 0.05 per cent is greatly decreased.

At Duquesne it has been the practice to add no lime with the initial charge, during meltdown or for reducing. Approximately 1000 pounds of lump 50 per cent ferrosilicon or its equivalent of chrome silicide, plus 300 to 500 pounds of 75 per cent ferrosilicon fines will do a thorough job of reducing the chromic oxide slag in approximately 20 minutes. If the reducing operation is done rapidly and the slag removed at once, no effect is noticed on the banks at the slag line.

Too little, if anything, has been said about the improved quality of stainless steels made by the oxygen blow process, according to Mr. Ogan. Since using oxygen steadily on all stainless heats, Duquesne Works and other corporation plants have noticed an almost 100 per cent lack of "backup heats" on the straight chrome grades. Although the oxygen is used early in the cycle, the hydrogen content of the bath is reduced to such a low level that any pickup during the reducing period and during tapping, if all precautions are taken, is not sufficient to cause the backup to take place. A point of additional interest mentioned by the speaker is the fact that oxygen has been used to shape a reducing slag and melt all additions introduced after slag-off with no power used during the remainder of the heat. Oxygen has also been used to finish a heat and tap it in cases of power failure.

J. E. Harrod, assistant superintendent, No. 2 Electric Furnace Department, South Works, Carnegie-Illinois Steel Corp., Chicago, pointed out that at his plant oxygen is supplied to the shops through a 2½-inch line from the plant Dri-Ox station. Maximum flow is 15,000,000 cubic feet an hour per outlet at a line pressure of 120 pounds. The gas, he asserted, is introduced by lance into the furnace through the wicket holes of the doors, the end of the lance penetrating the slag surface but not in the middle of the bath. The oxygen, he explained, thus impinges on the metal at the slag-metal interface.

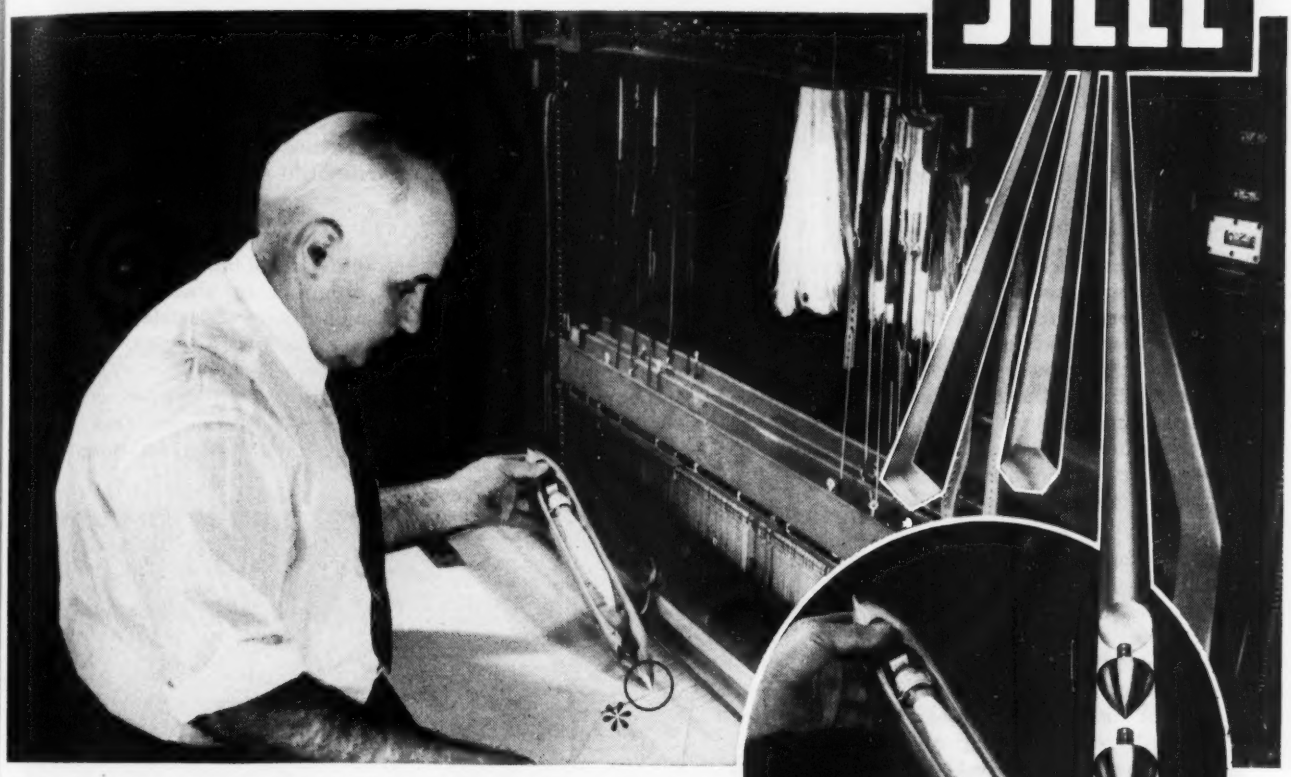
Use of oxygen in the manufacture of stainless steel, he stated, has been one of the factors responsible for the present day large tonnage production. Early production of stainless steel was devoted to small furnace and use virgin materials. With the increasing demand for these steels and the attempts to obtain production in larger size furnaces, using stainless steel scrap, the use of oxygen plays an important role. The disadvantages of the use of ore for deoxidation prompted operators to turn to large scale experimentation with oxygen for carbon reduction.

Advantages gained in using oxygen for the manufacture of stainless steels

(*Please turn to Page* 116)

DRAPER CORPORATION world's largest loom manufacturer LOWERS PRODUCTION COSTS WITH J & L COLD-FINISHED JALCASE STEEL

J&L STEEL



Mr. Joseph Whalley holds a shuttle from a modern Draper high-speed rayon loom to show the Jalcase tips.—Demonstration Room in Draper Corporation's modern plant, Hopedale, Massachusetts.

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Molten Salt Bath

Descaling Process

. . . materially reduces production time

By S. G. OSBORNE
and
H. R. SPENCE
Hooker Electrochemical Co.
Niagara Falls, N. Y.

This mixture of fused salts has the ability to change surface scale and other impurities chemically, permitting their removal in dilute acid in one-tenth to one-hundredth of the usual pickling time with no measurable effect on underlying metal

FIVE years ago a superintendent at a large steel plant, about to complete a professional lifetime in the mills, made what was then a startling prediction. "Twenty years from now," he said, "all steel in the United States will be cleaned in fused salts." Today this prediction seems considerably less startling. For developments in the steel industry are strongly stimulating use of fused salts.

In the first place, growth of high-alloy steel production has intensified the need for something better than acid for cleaning. These steels usually are very difficult to clean in acid alone. They may have to be cleaned several times in the process of fabrication by cold working, and their value is such that metal lost to acid attack represents a serious item of cost. Then, too, the sharp rise in wage rates has made it more important to adopt cleaning methods that can be carried on rapidly and continuously and that thus require less labor. Furthermore, widespread efforts to prevent stream pollution have raised new doubts about acid cleaning because of its large quantities of waste. These efforts have been reflected in industrial waste control programs by states and in the passage of federal legislation at the last session of Congress.

Fused salt descaling, which is being encouraged by these developments, is relatively new. One of the first such methods, known simply as

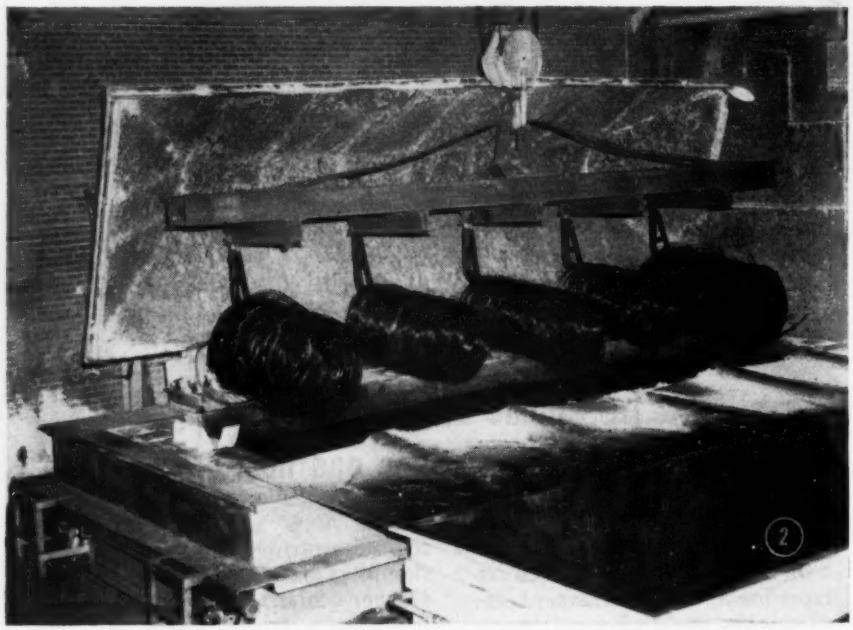

Fig. 2—Five tons of rods undergoing treatment. Tank shown contains 55 tons of salt

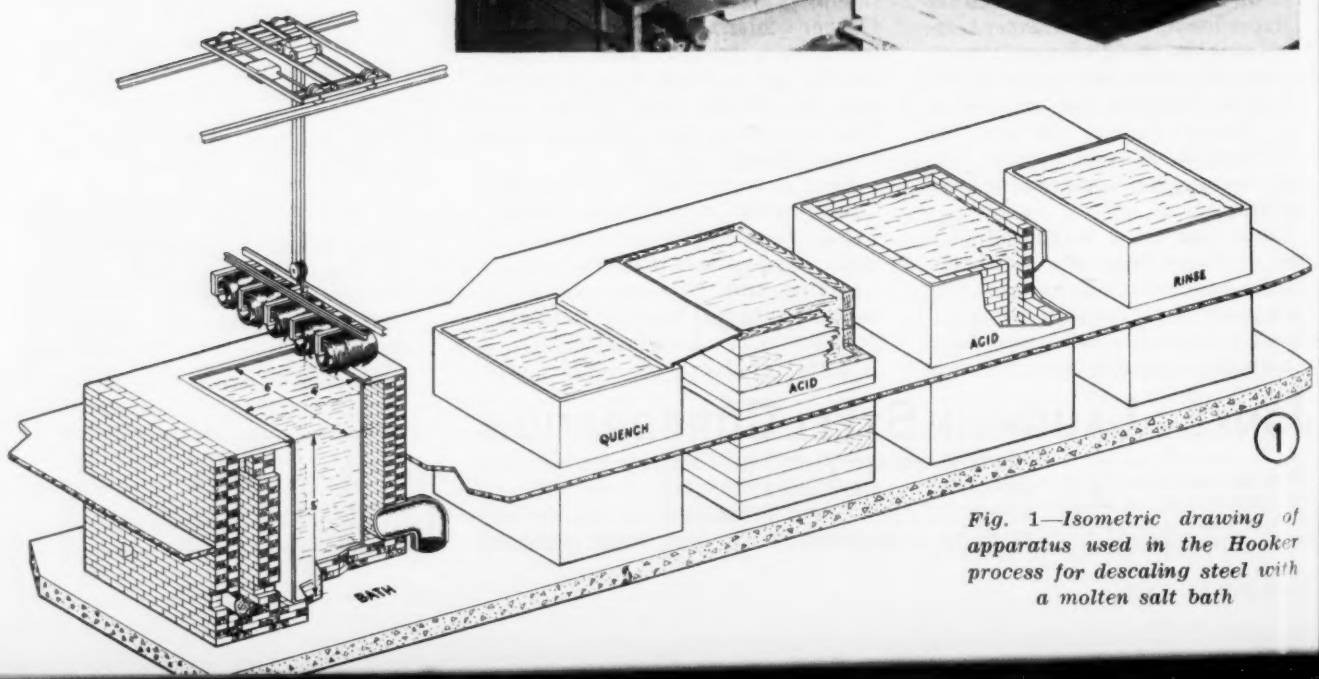

Fig. 1—Isometric drawing of apparatus used in the Hooker process for descaling steel with a molten salt bath

Photos courtesy Ford Motor Company

KAOCAST

CAR TOP Tops them all

Faced with the need of producing thousands of pressed shapes in its small tunnel kiln, the Ceramics Laboratory of the Ford Motor Company encountered severe disintegration of car top refractories because of rapid temperature changes — from room temperature to 2300 F and back again in two hours.

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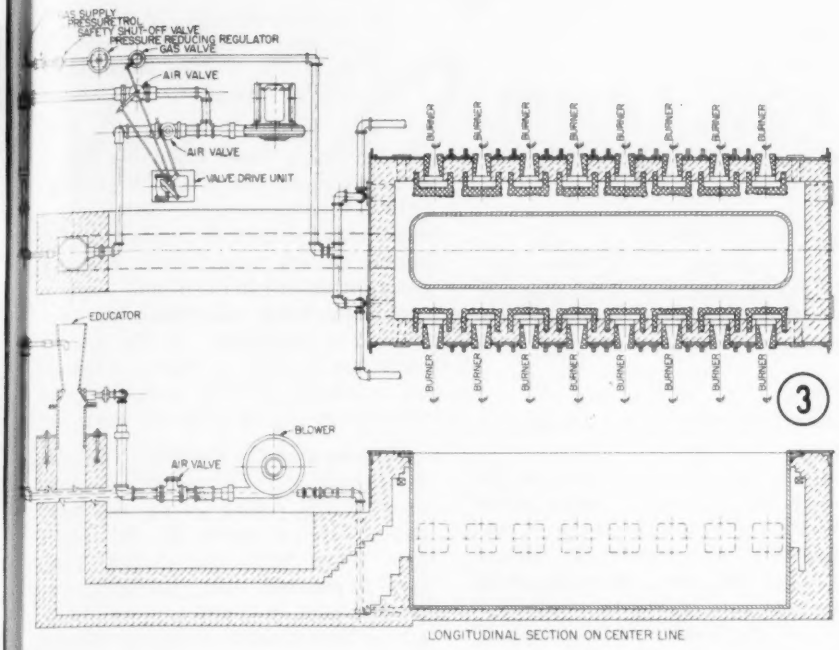


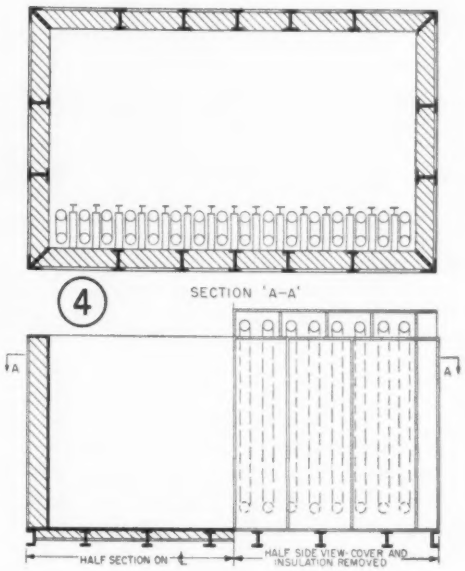


Fig. 3—Direct fire caustic bath furnace

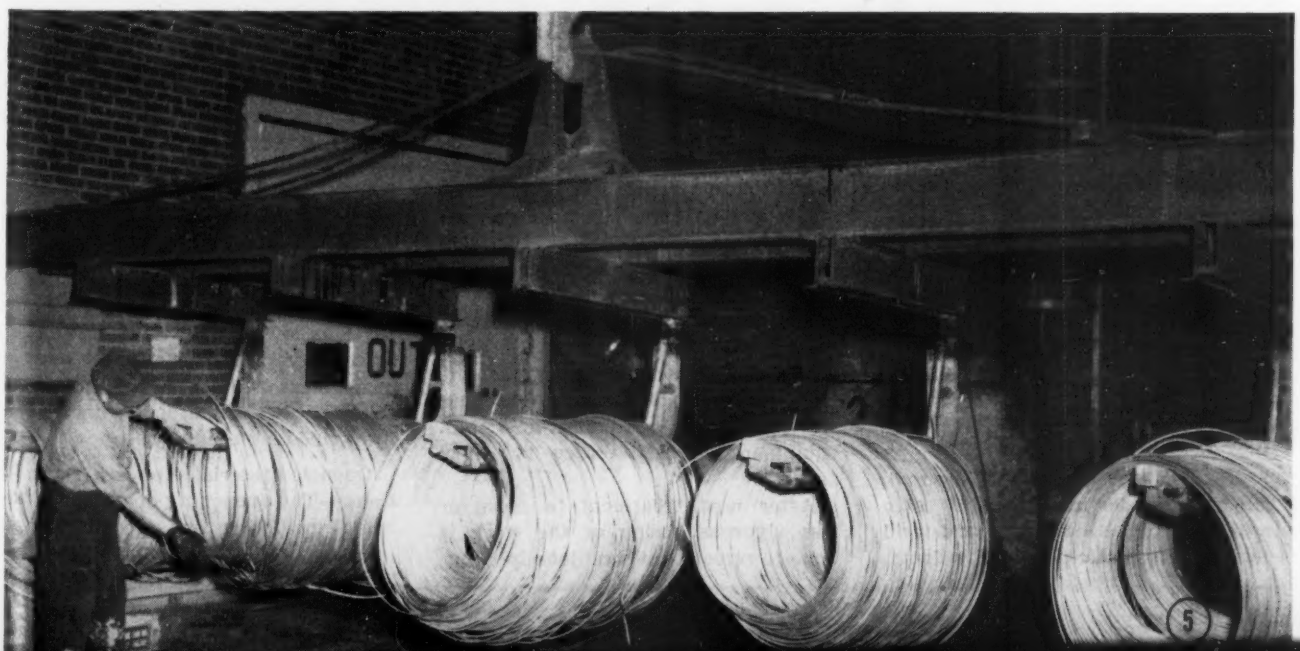
Fig. 4—Immersion tube caustic bath furnace

the electrolytic caustic process, was introduced as recently as twelve years ago by the late U. C. Tainton and Hooker Electrochemical Co. This process had been developed by U. C. Tainton in the absence at that time of any proven method of making the surface of carbon wire sufficiently clean for electrogalvanizing. In the electrolytic process, steel to be cleaned was made cathodic in fused caustic soda at temperatures between 800 and 1000° F. Sodium produced at the surface deoxidized the scale and left an easily removable sponge iron in its place. This method has been in use for many years in the continuous descaling of carbon wire, to which its speed of operation particularly fitted it, but its acceptance on a large scale was handicapped by lack of experience in heating and container design and operational technique, and the difficulty of obtaining uniform current distribution in the case of materials treated in batch form.

Stainless Material Presented New Problems—Attempts were made to apply the electrolytic process to stainless steels, just beginning to become important, but the fact that rod and wire were usually pickled in coil form, plus their high electrical resistance, made it unsuitable. The need for an easy method of dealing with high alloy steel was becoming steadily more important. Acid pickling took an excessively long time in most cases, precluding the possibility of continuous treatment by conventional acid methods. Expensive scale-breaking, particularly unsuited to very work-hardenable materials, was resorted to, and large plant areas had to be devoted to pickling and degreasing tanks. Such steels cold worked rapidly, and each interprocess annealing to condition them for further working necessitated another descaling operation. Some forms required as many as four successive annealing - pickling operations for each finished ton. Base metal losses were high, averaging between 1 and 2 per cent for each cleaning. On materials worth $500 a ton, these losses added 5 to 10 dollars a ton to the already high pickling costs. In addition, material was often badly etched.

The patented Hooker process using

Fig. 5—Same coils shown in Fig. 2 after final finishing-up



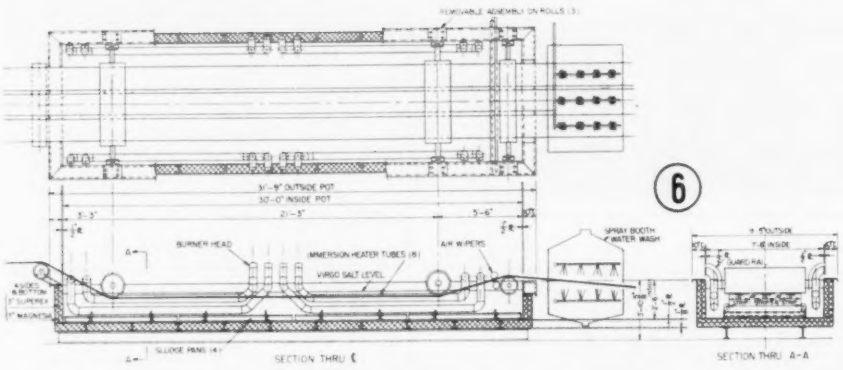


Fig. 6—Typical unit for descaling of hot rolled strip, roughing gage and process annealed strip

Virgo salt was developed by our organization and its associate, Tainton Products Co. of Baltimore, now a division of Freeport Sulphur Co., and was introduced in 1943. It won increasing acceptance, and there are now 38 units installed in 31 plants. Basis of the process is a dip in a molten bath of Virgo salt. This is a mixture of salts, which when fused, has the property of chemically changing the character of the surface scale and other impurities to permit their removal in dilute acid in one-tenth to one-hundredth of the usual pickling time with no measurable effect on the underlying metal. The molten salt bath is followed by a water quench and then by final acid treatment. A typical arrangement is shown in Fig. 1.

Existing Baths May Be Converted—For the salt bath a mild steel tank is used, and any of the three conventional methods of heating can be employed to bring bath temperature to its operating range of 900 to 1000° F. Existing units are heated either by external gas-firing, by immersion tubes of various types or by immersion electrodes, and individual conditions or preferences alone determine choice of heating method used. Except for temperature control mechanism, no auxiliary equipment is required. As a result, many types of galvanizing or heat treating baths can be converted by simply removing the contents and charging with Virgo salt. Figs. 3 and 4 illustrate constructions which have been employed for direct fire and immersion tube furnaces.

Externally fired tanks are designed to avoid direct flame impingement or overheating at any point. As is the case with any similar operation, improper equipment design or use resulting in over-heating will significantly reduce the life of the tank. With proper design, or where electrode or immersion tube heating is used, indefinite tank life is assured. Tanks are welded in such a way as to insure full penetration of sound weld metal at all corners. After welding, tank is preferably stress relieved by heating.

Suitable racks are provided in the case of batch treating baths which allow for the proper drainage of both molten salt and subsequent quench water and acid, using materials which will resist acid in the particular application in questoin. Almost any alloy which will do this will resist attack by Virgo salt if its melting point is not approached at Virgo operating temperatures. Pans are provided to collect sludge in such a manner that desludging is accomplished by merely lifting out the pans and emptying.

Water Spray Traps and Condenses Vapors—The quench tank is located fairly close to the salt bath and is usually approximately the same dimensions. No particular precautions need be observed in its construction since the water it contains becomes alkaline and inhibits corrosion. It is, of course, of much lighter construction and requires no insulation. Ventilation over the tank is employed in some plants to keep the steam and vapors which form from escaping into the room and in other cases the quench tanks may be blanketed with a spray of water while the work is being quenched, thereby trapping and condensing the vapors.

Location of the acid tanks is dictated largely by space and handling considerations. Since very short immersions in acid are required, tanks may be smaller than the salt tank if more than one rack of material is to be treated in the salt at the same time, the minimum size being that which will accommodate a single rack of material. The first of the acid tanks may contain dilute sulphuric or muriatic acid at about 160° F. When stainless is being treated, a second acid tank is used generally containing dilute nitric acid at the same temperature for brightening and passivation. Standard acid tank equipment is satisfactory in every case.

After acid treatment, a more or less vigorous hosing of the work is done to remove acid and loosely clinging smut. A hose supplying water at between 100 and 200 psi is generally used for this purpose. Same equipment may be used to remove the alkaline quench water from material before it enters the acid and between acid baths when more than one type of acid is employed. In the case of materials handled in batch a traveling overhead monorail crane handles work from one tank to the next.

Operation of the Process—The bath is charged with Virgo salt in flake form in 400 pound drums, and additional salt is added as the flakes melt down until the proper liquid level is reached. Only precautions to be observed are probing for undissolved lumps before bringing bath up to final operating temperature, and allowing ample room for expansion of the salt as temperature is increased from fusing to operating point.

Depending on the work being treated, time of immersion in the salt bath may vary from 1 to 15 minutes for optimum cleaning. Inadvertent over-treatment in the salt bath, however, results in no loss in base metal. In the case of some alloys, particularly when annealing atmospheres cannot be regulated to produce optimum and uniform types of scale, re-treatment has sometimes been found to be necessary. After treatment in the bath, work is allowed to drain for a few seconds, and it is then immediately moved over and into the quench tank.

Only addition which need be made to the bath in the course of operation is Virgo salt to replace that removed as dragout by the treated material. Chemical activity of the bath is automatically self-renewing, so that except for some rarely encountered conditions, no chemical supervision is necessary. Bath should be desludged at intervals varying widely with the type and volume of work. These intervals may range from once weekly to once every two years. In general, desludging three to four times a year can be expected.

Under stand-by conditions the bath may be allowed to cool to temperatures as low as 650° F using a cover to conserve heat. For longer periods of idleness, salt may be allowed to solidify. No attention during stand-by periods is necessary.

Quench Material Appears Dark in Color—The quenching operation is accomplished in a few seconds and is

(*Please turn to Page* 124)

13,000 MORE HOLES PER GRIND with CLE-FORGE HIGH SPEED DRILLS

• At the suggestion of a *Cleveland* Service Representative, the superintendent of a small production shop tested two types of stock drills on this job, drilling holes ¼ inch deep in free cutting brass at 5,000 r.p.m. One type drill averaged 9,000 holes per grind. The "Hy-Spiral" type CLE-FORGE High Speed Drill gave an average of 22,000 holes per grind! ◈ Test after test tells the same story—CLE-FORGE High Speed Drills produce holes faster . . . *at lower cost.*

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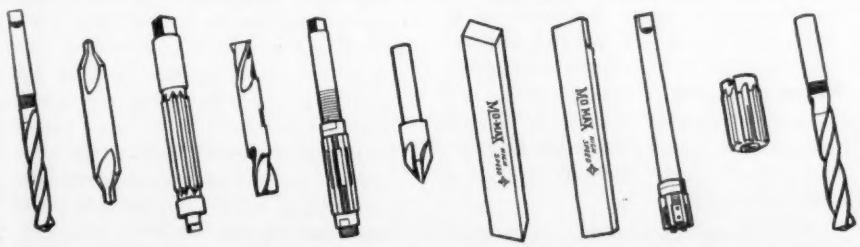

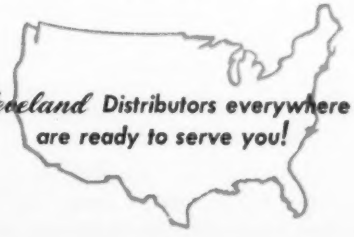

60,000-Ton Forging Press

. . . would revolutionize aircraft manufacture

AIR FORCE and aircraft industry planners have come face-to-face with the same problems which confronted German industry prior to the war: How to conserve material, manpower and time and how to obtain the maximum tensile properties from magnesium and aluminum alloy ingots. What the Germans did in their attempts to solve these problems, the Air Force and the industry now want to do—only bigger and better.

One proposed approach which captivates the imagination of the metalworking industries involves construction of the world's largest hydraulic press, a 60,000-ton Goliath which would dwarf the present largest, a 30,000-ton monster built by the Germans in Dusseldorf before the war, and would render puny the 18,000-ton press now in existence at Wyman-Gordon Co., Worcester, Mass.

Would Open New Fields—Feasibility of constructing such a press has been the subject of discussions between the Air Materiel Command and representatives of the light and ferrous metals industries, press manufacturers and press users throughout the United States. In addition to its military usefulness, such a monumental project would open up an entirely new field with unexplored peacetime applications.

Because of the need for industry's support of such an undertaking and because many of the problems which would arise would require solutions industrial in nature, the Air Force will not go beyond the preliminary planning until industry voices its approval. Appropriations for the developmental work have been granted Air Materiel Command, but without wholehearted industrial backing, AMC will use the grant only for experimental work on the Wyman-Gordon press.

In estimating the savings in materials and manhours and in projecting the usefulness of such a press in a national emergency, USAF has come up with an impressive array of statistics, based on German experience.

On a 19-foot tapered wing spar cap for a German fighter plane, for example, forging in the 30,000-ton press reduced the material required at start of the machining operation from 207 pounds (when produced by machining from extruded billet) to 64 pounds. Waste weight removed by machining with the older manufacturing method was 145 pounds, requiring about 85 manhours; the press cut excess weight removal to two pounds with five manhours required. Results similar to the saving of 143 pounds of material and 80 manhours were achieved on other aircraft components made on the press.

Three Methods Studied—Air Force calculates that manufacture of an A-26 wing spar cap by ordinary construction methods would require 275 separate parts and would make cost of each cap $267; a war-born manufacturing process, regarded as one of the best, reduced the number of parts to 18 and the cost to $166. But with an ultra-high tonnage press it is estimated this same job could be done at a cost of $85 per cap. Compared with the "splitting" method, which is conceded to be an excellent process, forging press manufacture of the cap would require only 248 pounds of material, against 500 pounds; 78.5 pounds of excess material would have to be removed, compared with 329; and 13 manhours (1 hour forging time), compared with 25 manhours for the previously "good" method.

High-pressure forging, the Air Force says, has been proved as a time-saver, and cites production of 67-inch-long magnesium alloy engine mounts. In a 5000-ton press, forging time in seconds per piece is 228, 7000-ton press reduces the time to 68 seconds, 10,000-ton press cuts this to 12 seconds, and one thousand additional tons in press pressure slashes the time in half.

The hard facts which must be faced with respect to future airplane developments were summarized by Richard F. Trimbach, project engineer for the proposed 60,000-ton press, when he explained that the wing spar cap of a medium bomber of modern design has heavier sections than the same part for a World War II long-range bomber.

Why Forgings?—What is in store, and why a monstrously large press is needed he emphasized thus: "The technical development of airplanes is going in the direction of faster, larger and more efficient models. This means higher loads in the stressed parts and the problem is to meet these high loads with a minimum of weight. Forging procedures are especially important since they produce parts which can be unsymmetrical in shape and have high strength in different directions. This fact is of basic importance since it enables the designers to use forgings, where in critical joints of connection, high stresses in different directions must be met. By conventional methods these parts are manufactured in the form of assembly of several parts held together by the use of rivets, srews, bolts or by welding. Large forgings can represent a combination of different single components; they make possible reduction in manufacturing and assembly time; they reduce the number of rivets and eliminate the weight of metal which is needed to make these critical joints."

Differential Manometer Is Highly Sensitive

Pressure differences as small as 1 millionth of an atmosphere over a range of total pressure from 1 millimeter of mercury to 1 atmosphere can be detected with a differential manometer developed by Harry Matheson and Murray Eden of the National Bureau of Standards, Washington. Operating on the aneroid barometer principle, it can be used to compare pressures of gases, organic vapors and noncorrosive liquids.

Instrument is useful in vapor-pressure work as less than a drop of liquid is said to be sufficient to compare an unknown vapor pressure as a function of temperature with that of a known liquid. Rest pointer is insensitive to temperature and accidental pressure differences as high as an atmosphere introduce only temporary hysteresis effects. Instrument is readily portable and need not be leveled before operation.

—o—

Hanna Engineering Works, Chicago, is offering an air cylinder selector and pneumatic calculator which makes it possible to find cylinder diameter, required gage pressure, force, pipe size and pressure drop in pipes and in fittings. By using the detailed instruction sheet it is also possible to determine cubic feet of free air required per inch stroke, required horsepower and cycles per minute or seconds per stroke.

H-Band Steels

(*Concluded from Page 90*)

bought to chemical composition specifications only.

Now that we have a wealth of hardenability data from hundreds of heats made with no effort to control hardenability, we are certain that the spread in hardenability (minimum to maximum) for any grade is some 20 to 30 per cent greater with steels furnished to standard steel chemical composition only than when working to H-band specifications. Fig 4 shows the situation with 4140 versus 4140-H. This grade is typical of all and the closer control of hardenability with H-band steels should be reflected in better performance in heat treating. It should be borne in mind that only about 7 per cent of heats having extreme high or low hardenability are being eliminated by H-band specifications, and also that in many cases no difficulty was being experienced with the wide range of hardenability obtained with steels made to chemical specifications only. With these two qualifications in mind, results of a recent questionnaire sent out to 27 large users of alloy steels by the Steel User's Subcommittee of division III of the Society of Automotive Engineers[6] is indeed surprising. Extracts from this report quoted below show that the H-band steels are performing as expected as measured by performance in the heat treating shop, which after all is the real criterion:

"1.—Elimination of insufficient hardenability
a. Carburizing steels
(1) Low surface hardness—13 users commenting
Reduced rejections with H steels.. 1
No difference 5
Insufficient data 7
(2) Low core hardness—10 users commenting
Reduced rejections with H steels.. 4
No difference 4
Insufficient data 2
b. Heat treating steels
(1) Low surface hardness—14 users commenting
Reduced rejections with H steels.. 6
No difference 2
Insufficient data 6
(2) Low cross sectional hardness—9 users commenting
Reduced rejections with H steels.. 5
No difference 3
Insufficient data 1
2.—Effect of hardenability specifications on warping and cracking
a. Carburizing steels
(1) Quench cracking—14 users commenting
Reduced rejections with H steels.. 1
No difference 9
Insufficient data 4
(2) Distortion—14 users commenting
Less distortion with H steels .. 6
No difference 4
Insufficient data 4
(3) Uniformity of distortion—13 users commenting
More uniform distortion with H steels 5
No difference 5
Insufficient data 3
b. Heat treating steels
(1) Quench cracking—14 users commenting
Reduced rejections with H steels.. 4
No difference 3
Insufficient data 7
(2) Distortion—14 users commenting
Less distortion with H steels .. 5
No difference 4
Insufficient data 5
(3) Uniformity of distortion—13 users commenting
More uniform distortion with H steels 5
No difference 5
Insufficient data 3
3.—Machining, forming, and straightening operations
Two users reported less difficulty with straightening and 3 reported some improvement with regard to machining or forming of hot rolled or normalized bars purchased under "H"' specifications.
4.—Relation to tempering
Six users reported fewer changes of tempering temperature with medium carbon steels, and one with carburizing steels."

In summary the subcommittee reported—

"On the whole, answers to the questionnaire indicate that considerable improvement has been made in elimination of the small percentage of heats, which are too low in hardenability to respond satisfactorily to production heat treatments. Distortion, warping, and cracking have been somewhat reduced. This may be due in part to reduction of maximum hardenability, however, it is believed that the smaller variation in hardenability of steel obtained from different producing sources is an important factor."

It seems evident from opinions expressed above by large users of alloy steel who have purchased steel for the same parts by both chemical specifications and more recently to H-bands that closer control of hardenability is giving the user a product that is more satisfactory in heat treating. In addition, one of the conclusions stated by A. L. Boegehold in a recent article[7] was that "Ordering steels by the H-band offers opportunities for obtaining desired results at lower cost."

Future of H-Band Steels Versus Standard Steels—The present trend shows an increase in tonnage of H-band steels as more and more users find that what they need is control of mechanical properties in their parts, and H-band steels are better suited to the purpose. On the other hand, there are many jobs where greater variation in hardenability encountered with steels ordered to the AISI-SAE chemical specifications is tolerable and they may need close control of chemical composition for other reasons. The H-band or hardenability specification steels can be improved further only if users will allow the latitude in chemical ranges the steel maker needs in return for closer control of hardenability. Specifying alloy steels to hardenability, or performance specifications is no more revolutionary than methods the melter must use to meet such specifications. By continuing the excellent co-operation between producer and consumer on this problem, America is again leading the world in pioneering this field. A user can now specify alloy steels to the tightest chemical ranges possible with present-day knowledge of melting steel or he can specify the tightest range of hardenability possible with the present state of the art.

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2—"A Hardenability Test for Carburized Steels"—W. E. Jominy and A. L. Boegehold—Trans. ASM, June 1938
3—"Progress Report on Hardenability Bands"—John Mitchell—AI&SI Yearbook—1945
4—"Hardenability Calculated from Chemical Composition"—M. A. Grossmann—Trans.—AIME, Iron & Steel Div.—1942
5—"Calculation of Jominy End Quench Curve From Analysis"—J. Field—Metal Progress Vol. 43, No. 3—March 1943
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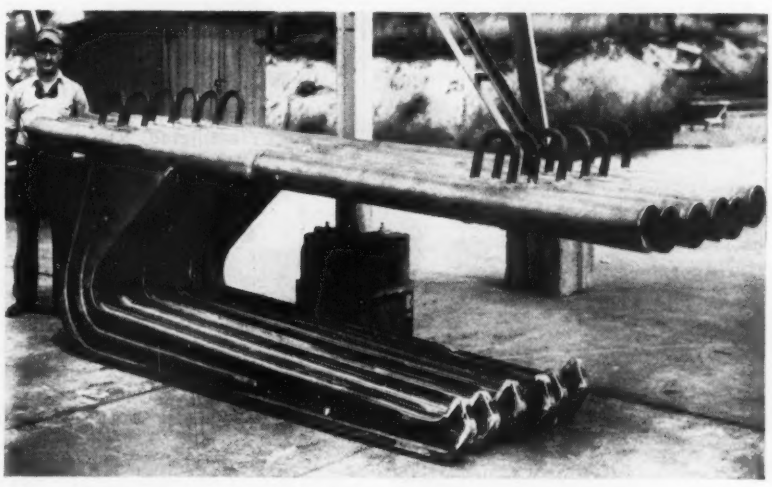

BIG HAIRPINS: Weighing 1272 pounds each, these six hairpin pickling hooks designed and made by Youngstown Welding & Engineering Co., Youngstown, O., are capable of carrying loads up to 4200 pounds. The hooks themselves are made of heavy Monel plate and the round supporting members of steel covered with a jacket of 14-gage Monel. Made for the pickling of wire and cable, the hooks were fabricated entirely by welding

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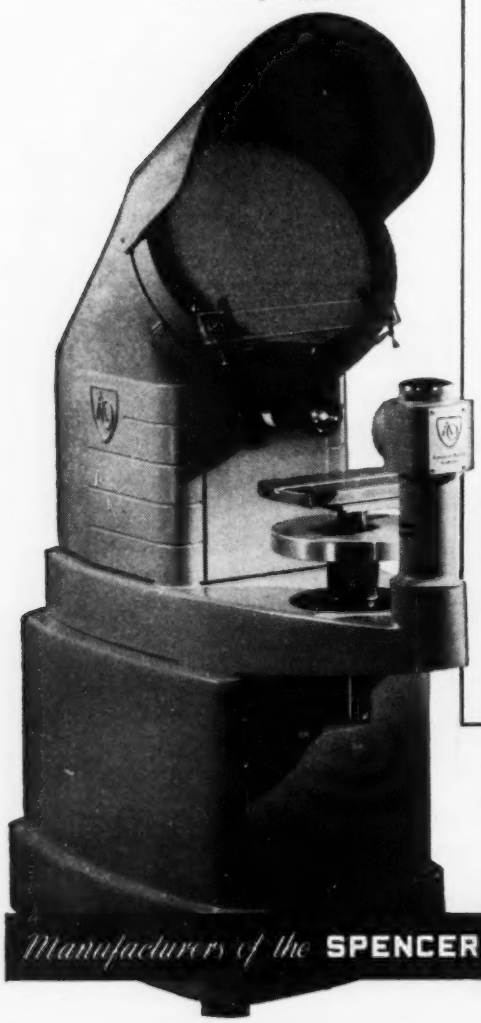

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Stainless Steels

(*Concluded from Page* 104)

are: (1) high percentage of stainless steel scrap can be used. (2) a high percentage of chromium from scrap is obtained. (3) The oxygen-chromium reaction is exothermic, thus providing additional heat which lowers the power consumption per ton. (4) Control of chromium content is better. (5) Control of quality is better particularly in the straight chromium grade.

The major portion of the electric furnace steels produced probably increases the alloy steels used for gears, bearings, aircraft and automotive parts in which quality with respect to soundness and cleanliness is important. Reduction of carbon with oxygen seems to be the most reliable method for producing quality steel. The amount of hydrogen introduced is reduced to a minimum and the purging of the oxygen further reduces the amount of hydrogen present in the bath.

Advantages of using oxygen in the manufacture of the quality alloy electric furnace steels are: (1) Fast carbon reduction with resulting fast heats. (2) More positive control of oxidation and rate of carbon reduction. (3) Greater control of quality of heats. (4) Greater recovery of manganese and chromium.

Since the war there has been electric capacity in excess of that requirement for the production of quality alloy and stainless steels, while at the same time open-hearth capacity is insufficient to meet demand for carbon steel of the rimming grades. In an effort to relieve this condition, considerable tonnage of rimmed steel has been made in electric furnaces.

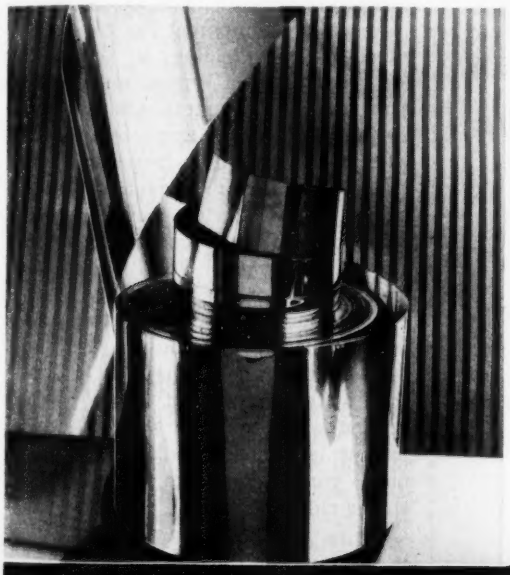
Advantages to be gained by using oxygen in the manufacture of rimmed steel are: (1) Rapid carbon reduction. (2) Positive control of carbon reduction. (3) Good rimming action.

South Works has found that the use of oxygen with proper application has resulted in a number of advantages. Faster heat times have been obtained primarily by the fast rate of carbon reduction and steel quality has been improved. Economic gains in the manufacture of stainless steels are most apparent by the increased use of stainless steel scrap with a greater chromium recovery. These gains have been great enough so that the present practices include the use of oxygen as the only material for carbon reduction on the electric furnaces to the complete exclusion of the use of ores as in earlier practices.

"Sampler" Portfolio Offered by Plated Metal Manufacturer

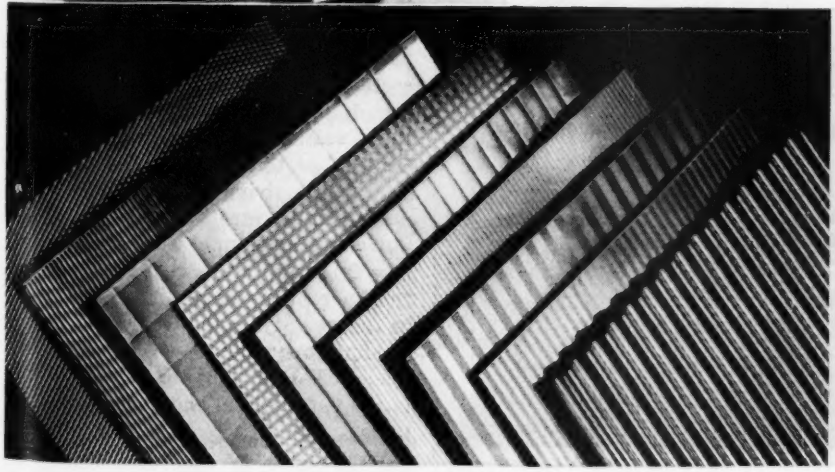
NOTHING speaks as loudly in praise of a product as a sample of the product itself, and this is certainly true of the gleaming, highly polished metals in various finishes and patterns that comprise the Nickeloid Metals line. The manufacturer of these metals, American Nickeloid Company, has just prepared a new portfolio showing representative samples of the metals themselves. They call it "The Sampler." These metals, available in sheets or in coils, comprise finishes of chromium, nickel, copper or brass, pre-plated to such common base metals as copper, brass, steel, zinc, or aluminum.

Designers, manufacturers, production men may have a copy of "The Sampler" free by writing on their company stationery and asking for Booklet No. 1.



Many people think that plated parts are always stamped and then individually plated. Hundreds of Manufacturers use Nickeloid pre-plated Metals in sheets or coils — stamp or form the parts — then assemble, without further polishing, plating or finishing. There is a basic economy in the use of Nickeloid pre-plated Metals which we would be glad to explain further.

Not only are Nickeloid Metals sampled in bright and satin finish plain metal, but in interesting crimps and stripes. Industry has found wide use for these pre-finished metals.



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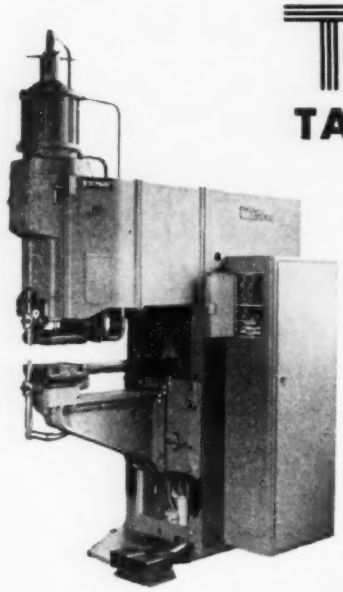

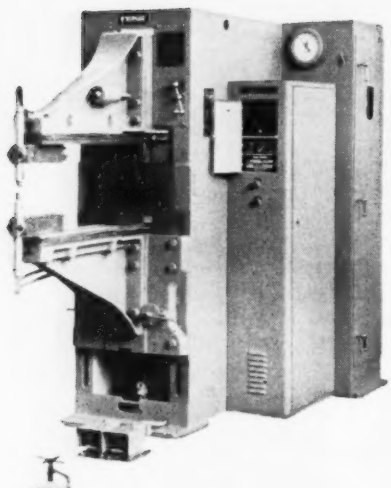

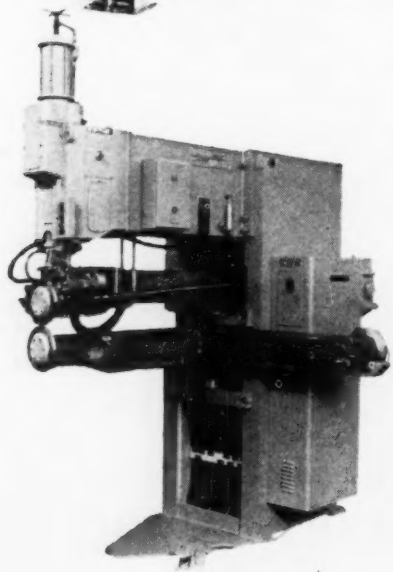

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TW TAYLOR-WINFIELD
RESISTANCE WELDERS

Spot Welds

(*Continued from Page* 86)

inch upon being removed from the framing jig. Two welds on each flange completely eliminate this separation. Hose assembly which carries welding current, water, gas and switch control are all encased within the rubber jacket.

Fig. 4 illustrates the use of the process to replace metal-arc tack welds on the front assembly. These welds are subsequently covered with body solder and so must be flush or slightly lower than the surrounding surface. With gas shielded spot welding, no grinding is necessary.

Method of joining side panels to the front assembly while in the framing jig is shown in Fig. 5. Resistance welding could not be used on this joint because of inaccessibility to the reverse side of the weld. Due to the extremely different section thicknesses — 0.037 to 0.090-inch — these welds on each side of the body are ideal for inert gas-shielded arc spot welding, and are responsible for approximately 70 per cent reduction in door fitting time on the line. Welds prevent distortion of the door frame when body is lifted from the jig.

Necessary equipment for inert gas-shielded spot welding is shown in Fig. 6. This is a typical installation consisting of a metal-arc welding transformer of 250 amperes capacity with a built-in high-frequency unit and power factor correction. Electronic timing device, power supply fuse box and main disconnect switch are to the right. Just behind the leading edge of the next body is visible the inert-gas cylinder and pressure-regulating mechanism. The two pipes to the rear of the fuse box are the water inlet and drain. The ground wire from the welding transformer is connected directly to the metal conveyor system on which the bodies ride.

Other Applications—In addition to the automotive operations, the process has been successfully used in attaching light sections to very heavy sections. It is entirely possible to attach 0.040-inch sheet to a 4-inch thick section in the various metals. Because of this, the process is practical for applying stainless steel liners to mild steel pressure vessels. Surface of the mild steel should be free from mill scale, rust or dirt, and the liner must contact the mild steel in the vicinity of the weld during the welding operation. Welds can be made on this type of construction in the flat, vertical and overhead positions.

Welds of this type in stainless

steel have the same corrosion resistance as inert gas-shielded continuous welds. In those materials subject to carbide precipitation, the zone of precipitation around the weld will be extremely narrow due to the quenching effect of the heavier mass behind the weld. Weld time and current cycles can be set up so that very little dilution of the stainless steel liner by the mild steel back-up occurs. In fact, this dilution can be restricted to the area of juncture between the mild steel and stainless steel.

This method can be used satisfactorily to attach the top sheet to a corrugated sandwich, such as is used in the manufacture of trailers and railway equipment. A corrugated sandwich is made by resistance welding top of the corrugated sheet to one of the side sheets. When attaching the final sheet to the sandwich, difficulty due to the inaccessibility of the reverse side of the corrugation makes resistance welding impractical for the final operation. Gas-shielded arc spot welding is used on these operations with very satisfactory results. Sandwiches have been made employing as many as 700 welds in this manner for the final assembly.

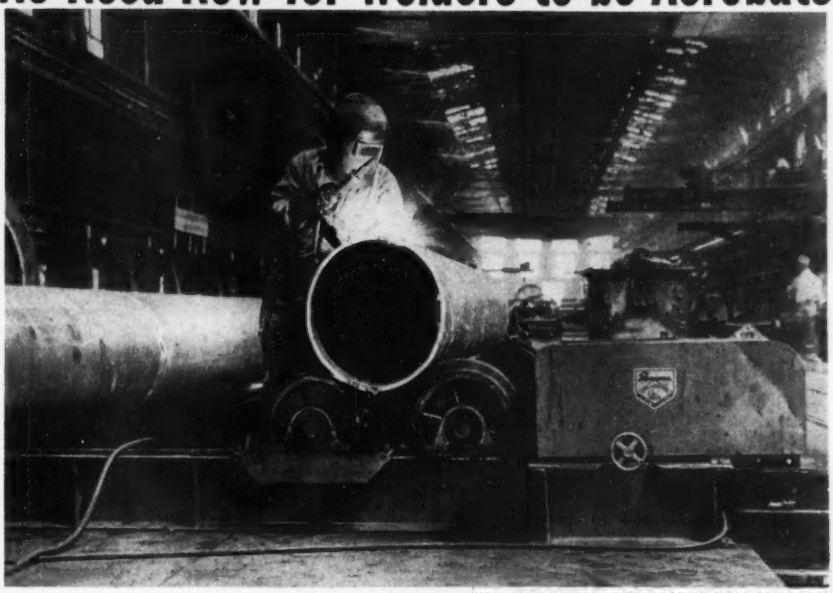
This tool becomes extremely useful for railway car and automotive trailer repair service especially for stainless steel bodies and parts. For such repairs, it is merely necessary to install a patch or repair from the outside of the structure and use gas-shielded spot welding for the final joint.

With an increase in availability of apparatus, it is conceivable that the automotive shops will also find wide application for the process in other repair work.

Metal furniture and cabinets can be easily fabricated by this process. Manufacturers of such widely diversified objects as outdoor display signs, home appliances, and food handling equipment will find wide use for the process. Mild steel and stainless steel in thicknesses up to 0.078-inch are being successfully welded in production. Aluminum materials up to 0.064-inch thick can also be welded with the same speed and satisfactory results.

Welding Conditions for Aluminum—Welding conditions for aluminum are somewhat different from those of mild steel and stainless steel. Due to the conductivity of aluminum, it is necessary that the sheets be in very intimate contact, in order to obtain consistent and satisfactory results. To obtain the required fitup, some means must be employed to back the reverse side of the weld. In the case of large structures, this may be done

No Need Now for Welders to be Acrobats



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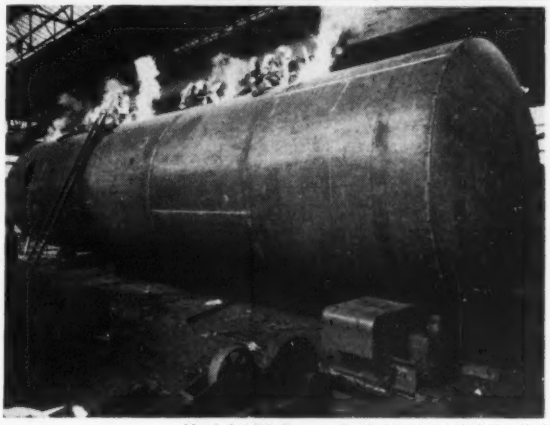

Model APR Power Roll, Model AIR Idler Roll

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Welders can make all welds "down hand" with heavier electrodes when Ransome Turning Rolls bring the work into convenient working position for *increased production* and *neater, better welds.*

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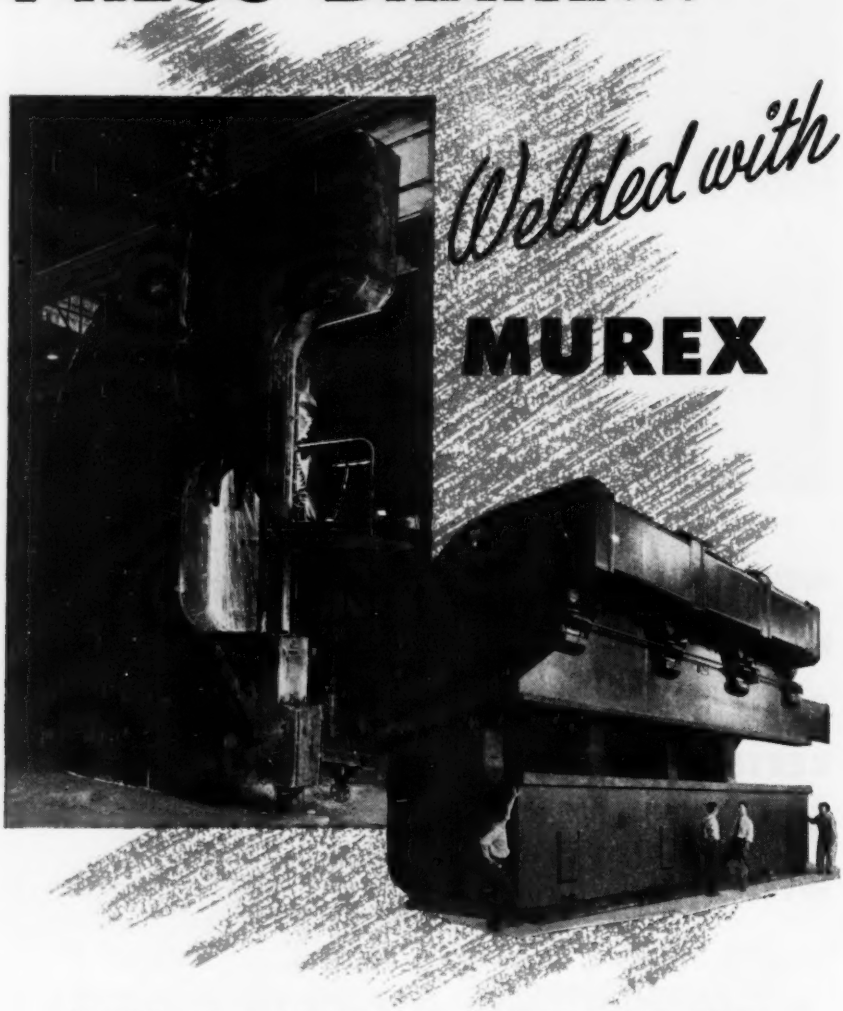

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This huge unit, of fully stress-relieved welded steel construction weighs more than a half million pounds without dies. It is designed to exert a pressure of over 1,000 tons for bending steel plate 5/8" thick to a right angle and in a single stroke in lengths up to 36 feet.

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by a bucking bar held by a helper. Where smaller objects are made on a production basis, blocks can be located in a fixture to back the weld.

One rather unique feature of the process is the fact that it is possible to control the current and time settings so that welds can be made without disturbance to the reverse side of the sheet being welded. As an example of this it was possible to produce five spot welds on an aluminum refrigerator vegetable bin assembly, in which the reverse side of the spots was exposed and painted with a high gloss enamel. Inert gas-shielded arc spot welding was used without the necessity of a finishing operation.

Surface conditions of aluminum materials require special attention when gas-shielded spot welding is applied. Oxides, carbonaceous materials, and surface dirt must be entirely removed before welding. Chemical cleaning, vapor blasting, or scratch brushing will produce satisfactory surfaces.

Physical Properties — Depending upon material thickness, welding conditions and rapidity of operation, cost per spot ranges between 1 to 4 mills and welding times range around 1/2 to 6 seconds per spot. Weld rejects, due to weld failures, average about 1½ per cent. Malformed welds due to electrode contamination with the weld puddle and burn-throughs due to sheet separation and extremes in power factor variation average 4.2 per cent rejects. Table I gives physical properties for various thicknesses of mild steel and stainless steel, for spot welds as made by the inert-gas process.

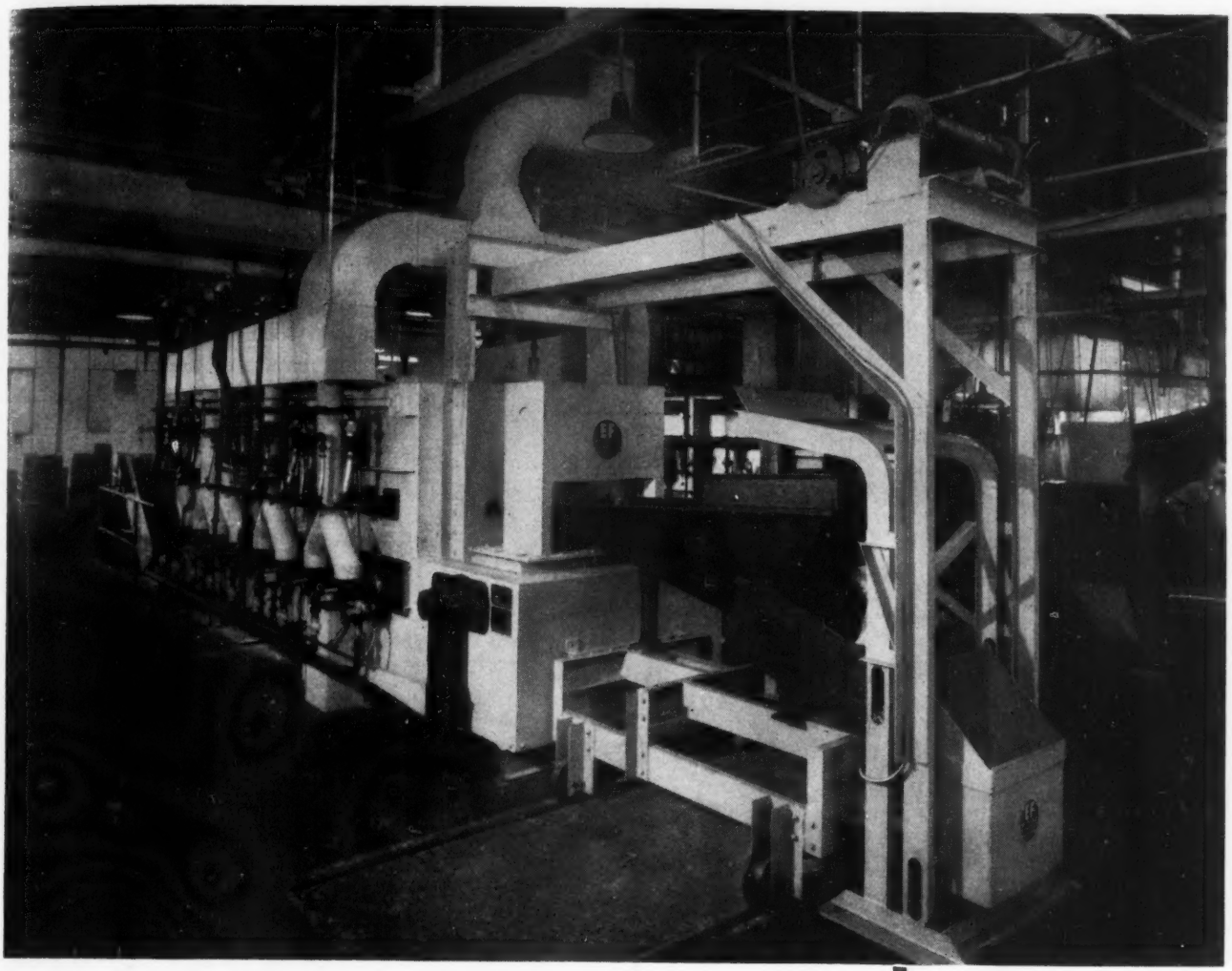
Direct tension static samples of the inert-gas spot welds have lower values than the resistance spot welds. In all other kinds of tests, however, they very closely approximate the generally accepted resistance spot-welding values.

Table II gives welding conditions and test data for inert-gas shielded arc spot welding.

From data presented at the annual meeting, American Welding Society, Philadelphia, Oct. 24-28, 1948.

—o—

An accurately designed, 1/4-inch scale model fork lift truck is being offered by Towmotor Corp., Cleveland, for assistance in formulating efficient factory layout plans. The trucks, available to plant management at $1.50 each, are easily moved about, rolling on scale size wheels. Scale model loads can be carried on the forks.



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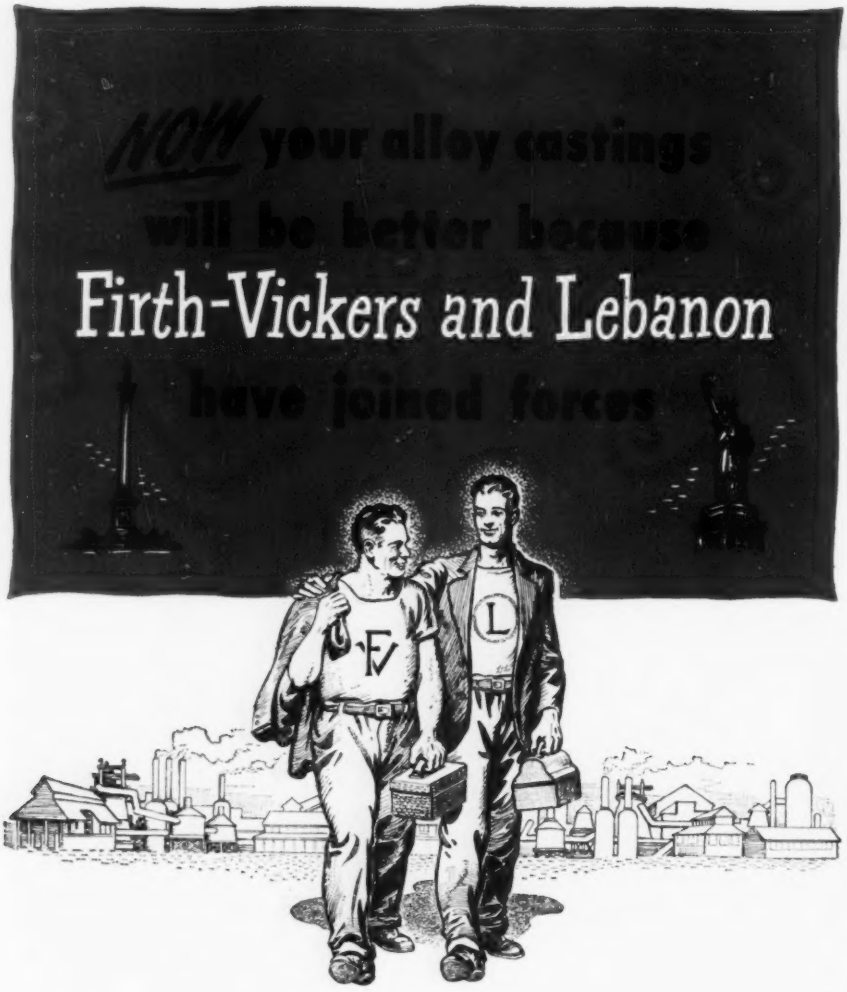

Corrosion and heat-resistant alloy steel castings of certain types acquire better characteristics when made by the Centri-die process in permanent molds. This method was developed by Firth-Vickers of Sheffield, England, over a long period of experimentation. It is largely responsible for the superior qualities of the Rolls-Royce, De Havilland, Bristol and other British airplane jet engines. Since the war it has been widely applied to castings for corrosion and heat-resistant service.

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LEBANON *ALLOY AND STEEL* Castings
CIRCLE L

Descaling Process

(*Continued from Page* 110)

without any particular hazard to the worker, steam being the only product. After quenching the work is dark in color, due to the fact that a thin residual film of the modified oxide is still clinging to the surface. If the quench tank is not of the type employing a water spray directly over it, the work is hosed to remove any alkaline quench water in preparation for acid treatment.

One feature of the process is that the thin residual oxide coating, usually brown in color, has desirable corrosion resistant properties. In some cases where material is to be drawn, coating may be left without acid treatment, as it seems to provide a base or "tooth" for drawing compounds. For most applications, however, and for many inter-process applications, it is necessary to remove this coating by treatment in acid.

In general, an immersion of from 1 to 5 minutes in the sulphuric or muriatic tank is used. When stainless is being treated, a second and shorter dip in a nitric tank is given.

Following acid treatment, the work is generally hosed to leave the surface perfectly clean.

Chemistry Involved—It is now generally agreed that scale of plain carbon steels exists as three fairly distinct layers: An outer layer of ferric oxide; a middle layer of the magnetic oxide, often referred to as the magnetic phase; and the inner layer of a ferrous phase constituting the bulk of the scale. This latter is not true ferrous oxide as its oxygen content is somewhat greater than that demanded by the stoichiometric formula FeO.

In acid pickling it is largely the ferrous phase next to the metal which is attacked, probably by an electrolytic action made possible by the acid seeping through the cracks in the outer layers. It is the dissolution of this phase that causes outer layers to flake away. At the same time the ferrous phase is much more porous than the magnetic phase and is therefore of greater permeability to the acids. Action of the acid on base-metal itself with the resulting bursting action of the hydrogen so formed, plays a big part in the acid pickling mechanism. Any means, therefore, of modifying the permeability of scale materially assists the pickling operation, and any reduction of time of immersion in acid reduces metal loss.

With the more highly alloyed steels, scale is more complicated, as oxides

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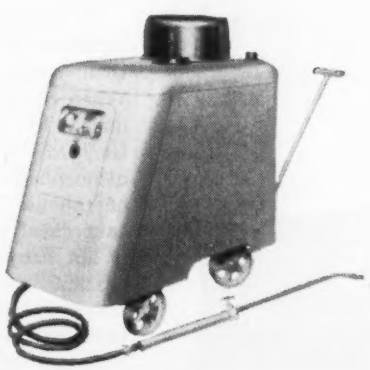

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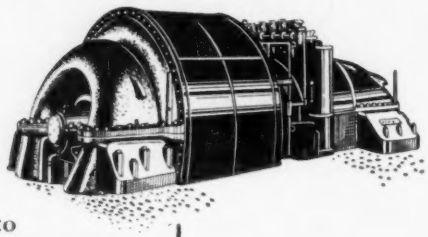
Filtered Air solves blade erosion problem on Turbo-Blowers



WHY should the life expectancy of impellers in turbo-blowers be limited to six, nine or eighteen months? The reason —when quantities of abrasive dust and dirt, such as found in unfiltered air, are permitted to enter a high speed, rotary blower, rapid wear and erosion of the impeller is certain to result.

Installation of AAF Multi-Duty Air Filters at the blower intake has proven a practical solution to this problem. In one mill, where unfiltered air had completely ruined the impeller after 17,000 hours' operation, the replacement unit checked after 12,000 hours with Multi-Duty filtered air showed no trace of erosion.

The AAF Multi-Duty is an automatic self-cleaning air filter. Overlapping panel construction of the filter curtain combines positive self-cleaning and high efficiency air cleaning as integral functions of the operating cycle. Uniformly constant air supply is assured as operating resistance remains fixed when once established for a given dust concentration.

The Multi-Duty's record of prolonging impeller life, eliminating costly repairs and untimely shutdowns warrants your immediate investigation. For complete information contact your local AAF representative or write direct to:

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of some of the alloying elements, often of a highly refractory nature, are also present. It has been shown that in the case of chromium steels, the chromium is present in the total oxide layer to a greater extent than in the metal itself. Chromium plate and stainless steels owe their corrosion resistance to the fact that they are protected by a thin, transparent film of chromium oxide which is chemically very inert to most substances. It is partly due to this chemical inertness that acids alone have been unsatisfactory in dealing with the extremely heavy oxides containing chromium which are formed on the surface of stainless steels after hot working or process annealing. In addition, such scales are physically extremely dense, forming a hard, vitreous glaze over the surface of the metal, which the acid has difficulty penetrating.

Salt Bath Chemistry—Virgo salt consists of a mixture of alkali metal hydroxides, oxidizing agents and certain catalysts. The salt in molten condition has both a chemical and physical effect upon surface scale.

Oxidizing agents are such that they do not release their oxygen except where and when needed, i.e., in the presence of scale being treated. Oxides of scale react under the conditions of operation with the oxidizing agents actually in contact with them, these oxidizing agents otherwise being completely stable. Certain components of the scale, notably those of the more amphoteric metals, are oxidized to a higher form in which they are free to react with the fused alkali of the bath to form compounds which are literally dissolved out of the scale. This is particularly so in the case of alloys containing chromium. In addition, other scale components, notably those in a low condition of oxidation at or near the surface of the base metal, are oxidized to a higher state, which results in a volume increase that adds considerably to the looseness and general porosity already achieved by the removal of components which are soluble.

A feature of the combination of oxidizing agents in the Virgo salt is their automatic regenerative ability. When oxidizing agents have been reduced by reaction with the scale, they are immediately reoxidized by atmospheric oxygen at the surface of the bath, aided by traces of certain catalysts. The bath, therefore, is not subject to deterioration in operation except in rare instances where volume of work being put through the bath is so great and the quantity of salt removed with the

work relatively so small that sodium chromate, for instance, may build up over a long period of time.

Two chemical effects tending to modify greatly the physical character of the scale have already been mentioned: Removal of certain of the components through actual solution in the bath; and swelling up through oxidation of other components at the bottom of the scale layer, tending to loosen and prepare scale for further treatment. A third effect, achieved in the quench, also plays an important part.

Chemistry of the Quench — The quenching operation is much more than a device for removing molten, alkaline salt from the surface prior to acid treatment. The violent evolution of steam which takes place occurs not only at the immediate surface but also within the body of the porous, loosened scale. This action physically removes all but the thin, uniform film previously referred to which is sometimes used as a base for drawing lubricants or as a finish in itself. This film may be removed in acid with little more than a flash treatment.

In addition to the porous nature of the remaining, superficial oxide film, its chemical nature has been modified to make it far more reactive with muriatic or sulphuric acid. The preceding treatment in salt also appears to eliminate local anodic and cathodic areas on the surface of the base metal so that after removal of the oxide film has occurred, there is no tendency by the acid to produce the type of local attack on the base metal surface which would result in pitting. Moreover, acid treatment phase of the process is on the whole so mild and rapid that this could not occur to any great extent in any case.

Function of the final, nitric acid treatment, employed in some cases, is for brightening the metal and serves to provide a degree of passivation in the case of stainless steels, the surface of which may have been activated by a previous muriatic treatment.

Final high-pressure hosing is designed to remove any "acid smut", consisting of loosely adhering colloidally sized particles of matter on the surface which are characteristic of oxidizing acid treatments.

Advantages of the Process—It may be seen from the preceding section that various advantages may be claimed for this process. These include its relative simplicity, low cost of operation, low cost of equipment and small plant areas required, low cost of chemicals, low cost of labor, low rate of sludge accumulation, rel-

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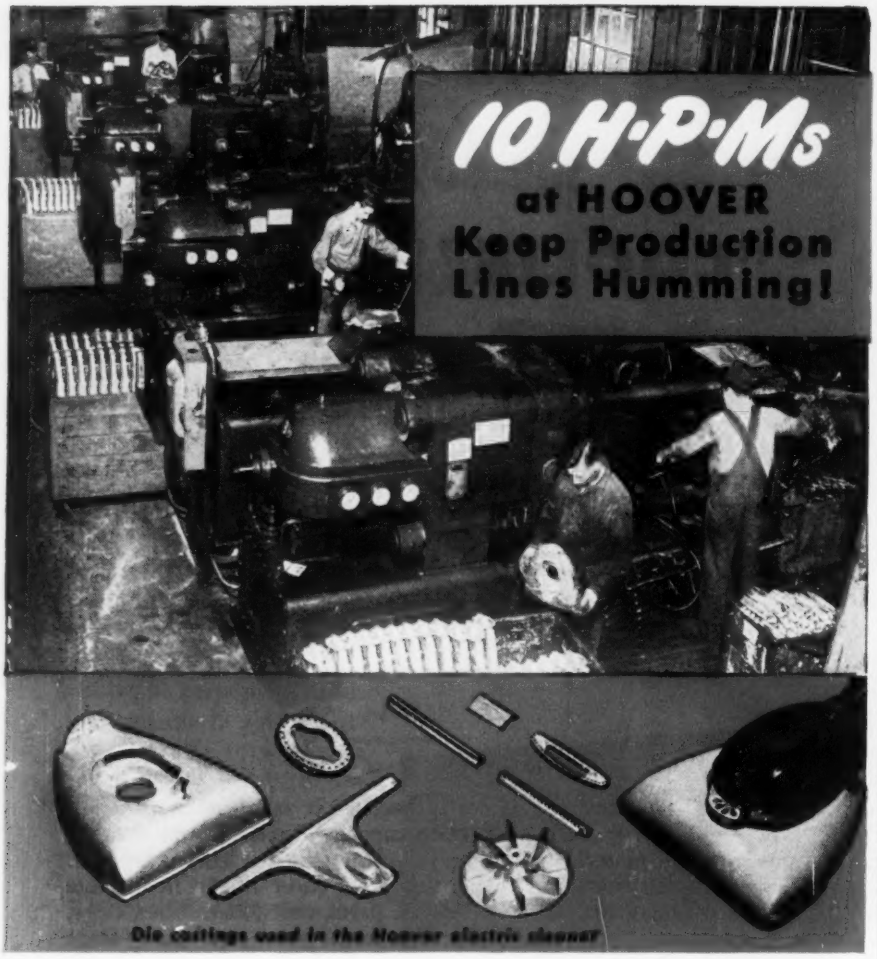

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ative safety, and absence of necessity for attention in stand-by periods.

Another feature of the process is its relative freedom from the problem of waste disposal. In contrast to acid pickling, which creates a serious problem of waste disposal, much less acid is used in the process and consequently there is much less waste acid to dispose. What there is can be neutralized in part or in whole by the alkaline quench water. Problem of waste disposal is therefore very much reduced and, in favorable cases, may be entirely eliminated.

Process Seen As Versatile—Actual industrial installations illustrate the diversified fields in which the process is used. Chrome nickel and straight chrome stainless, carbon, stainless clad, nickel, resistance alloys and many special types of heat resistant alloys are being treated in batch and on a continuous basis in rod, wire and strip, as well as in bar, tube and sheet forms. Descaling and desanding of forgings and castings by this method is an expanding use. Installations accomplishing the above tasks vary in size from units containing only a few pounds to units holding nearly 100 tons of fused salt. Other and substantially larger units are under construction, one of which is to be the largest fused salt installation in the world. As a result of recent installations, rate at which steel is now being cleaned by the process is more than double that of a year ago.

In wire plants, ten units are in constant operation for descaling wire and rod in coil form. The largest of these units has a salt capacity of 55 tons. It is capable of treating up to 20 tons of wire and rod per hour. Another such unit, the pioneer installation, at the Wilbur Driver Steel Co., has been in operation since March of 1944 and is treating quantities of various special alloys high in nickel and chromium. Other large units are under construction, one of which will be the largest salt bath for descaling wire ever to be put in operation. Fig. 2 shows five tons of rod undergoing treatment, and Fig. 5 shows the same coils after the final finishing-up.

Other units are descaling stainless strip on a continuous basis and units for continuous descaling of carbon strip are under construction. Fig. 6 shows a typical unit designed for the descaling of hot-rolled annealed strip, roughing gage, and process annealed strip. In this installation a bank of heating tubes is installed on both sides. Speed of operation, which has fitted the process to the difficult problem of continuously de-

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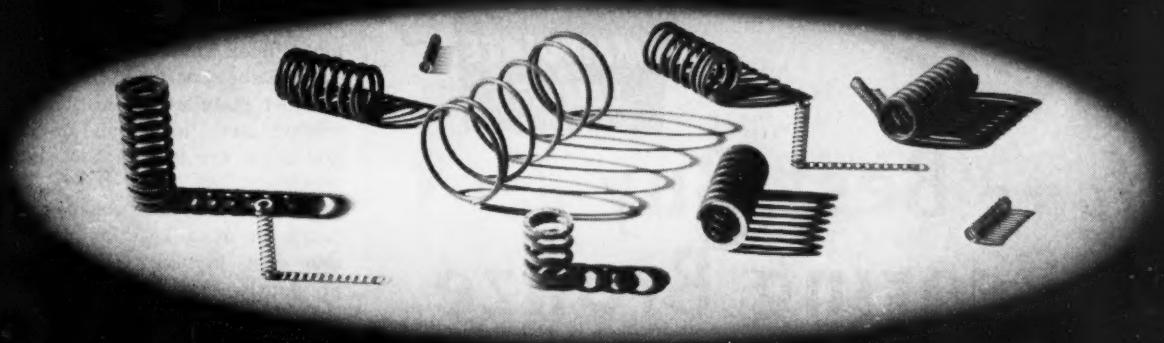

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scaling stainless in a reasonable amount of time and equipment, has already added itself as another factor recommending consideration of the method for appropriate forms of carbon steel on a labor-saving continuous basis.

Batch descaling of hot-rolled stainless strip, sheets and plates has been demonstrated over a number of years of operation in units with salt capacities ranging from 20 to 100 tons, with larger units planned.

Stainless steel tubes are being descaled in large units at the Babcock and Wilcox Tube Co. and at the Globe Steel Tube Co. in Milwaukee.

Other installations are used for descaling and desanding of castings, and units are under construction for treatment of very large, intricate castings which may be descaled and desanded at a fraction of the time and cost involved in the methods previously employed. A feature of the process which lends itself particularly to this use is its tendency to degraphitize the surface of castings and to provide a better bond for subsequent enameling or finishing operations. A large unit has recently been installed for one of the major automobile manufacturers for simultaneous descaling and stress relieving of forgings and castings. Normal operating temperatures are sufficient to efficiently stress relieve in a short immersion period.

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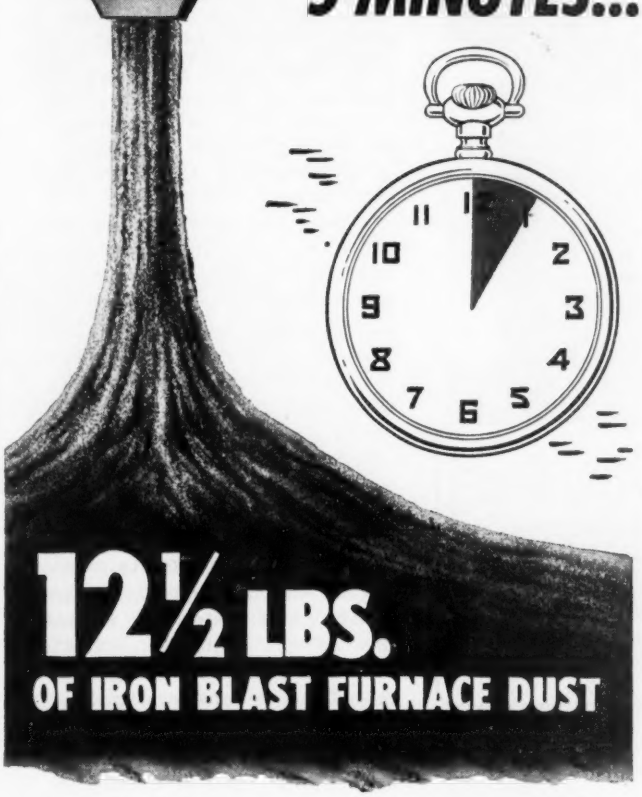

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Bibliographic Corrosion Survey Published

Bibliographic Survey of Corrosion 1945, by Robert D. Misch, James T. Waber and Hugh J. McDonald, Corrosion Research Laboratory, Illinois Institute of Technology, Chicago; cloth, 129 pages, 8½ x 11 inches; published by National Association of Corrosion Engineers, Houston, Tex., for $5.00 ($4.00 to members).

Approximately 1100 references to published articles relating to corrosion and 170 references to patents, which appeared from January, 1945 to February, 1946, are included in the bibliography. References are from the following publications: Chemical Abstracts, Corrosion, Corrosion and Material Protection, Engineering Index, Industrial Arts Index, Metals Review.

Abstracts are divided into two classes, general material and patents. Each class is divided into nine main groups: Types of attack; investigation in corrosion; effects of specific media; effects in specific equipment; resistance of materials; methods of prevention; coatings; removal of corrosion products; and general and miscellaneous considerations. A volume is being planned to contain references to corrosion literature published in 1946 and 1947.

British Internal Stress Symposium Published

Symposium on Internal Stresses in Metals and Alloys, cloth, 485 pages, 5¾ x 8¾ inches; published by Institute of Metals, 4 Grosvenor Gardens, London, S.W. 1.

The symposium, organized by the Institute of Metals and held in association with six other British societies, was held in London, October 15 and 16, 1947. Contents of the book are divided into three sections, the last two being subdivided into two parts each. Section titles are: I, Measurement of internal stresses; II, the origin, control and removal of internal stresses, (a) origin, (b) control and removal; III, effects associated with internal stresses, (a) effects on a microscopic and submicroscopic scale, (b) effects on a macroscopic scale.

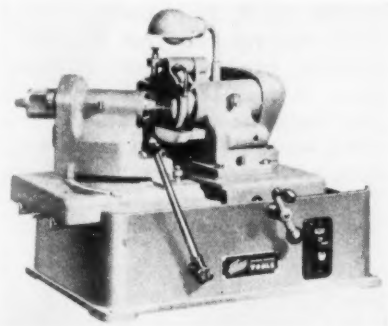
Thirty-six papers in all are included in the three sections. They were given by men outstanding in the fields on which they spoke. A record of the discussion of each section is included in the back of the book.

New Products and Equipment

Valve Refacer

Independent Pneumatic Tool Co., 175 State St., Aurora, Ill., is producing the 99 valve refacer, designed for precision wet grinding. The Thor refacer is equipped with a double-grip collet and a speed chuck for fast valve refacing at all standard angles.

Of extra heavy construction, it has automatic bearing compensation at

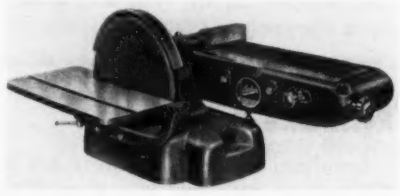


critical points of wear. Sliding heads feature smooth riding three-point suspension on hardened and ground slide rods. The collet is hardened, ground and internally lapped, being gear driven by its own motor. The new chuck permits large butt-end valves to be admitted and released with only one turn of the 2¼-inch hand wheel.

Check No. 1 on Reply Card for more Details

Belt and Disk Sander

A 10-inch diameter disk and a 4-inch wide belt feature the No. 5010 belt and disk sander for metals, wood and plastics, designed by Atlas Press Co., Kalamazoo, Mich. It handles



long, short and wide boards, irregular shapes, edges, ends, curves, angles and double angles. Equipped with precision ball bearings, the sander's table tilts 45 degrees both ways.

Herringbone slots in the belt sander table keep the underside of the belt clean and aid in maintaining a good working surface. Base and frame are heavy, well-braced castings. Sanding disk table is supported by double trunnions at left and single trunnion at right. Belt sander operated is in both horizontal and vertical positions. Disk and guards are removable for sanding wide objects. Belt tension and alignment are adjusted with knobs.

Check No. 2 on Reply Card for more Details

Piston Pin Checker

Average diameter of piston pins is checked and they are automatically segregated into six classifications by a new machine developed by Sheffield Corp., Dayton 1, O. Pins are manually loaded into a chute which has a "no go" gaging fixture to prevent oversize parts from being accepted.

Remaining parts are gravity fed into a locating V where a motor

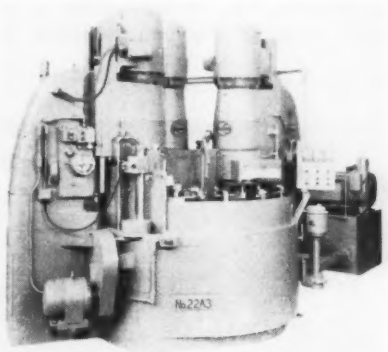
driven arm progresses a part into an air ring. After it comes to rest, it is checked by jets mounted in the right which operate Airlectric heads. These in turn actuate solenoids which open and close trap doors to the segregating chutes. Pin is then pushed through the air ring by the next pin to be checked and is carried along by the traveling mechanism until it reaches its proper trap. Segregating rate is about 2400 pins per hour.

Check No. 3 on Reply Card for more Details

Surface Grinder

Three wheels measuring 22 x 4 x 16 inches, a work table of 68 inches outside diameter and 40 inches inside diameter are on the No. 22-A-3 automatic surface grinder being introduced by Blanchard Machine Co., 64 State St., Cambridge 39, Mass. The work to be ground may be of any size that will lie between the inner and outer edges of the table. Standard height for work is 12 inches, but greater heights can be provided for by extending the columns.

With two wheels roughing and one wheel finishing, the machine is capable of removing any amount of stock that is usually allowed on castings within its capacity. The three heads and columns, with feed mechanisms and size control calipers are identical. It may operate with one, two or all

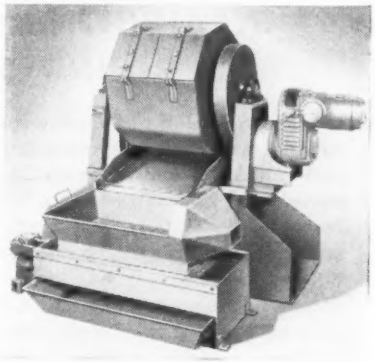


three wheel roughing. Final size is held within plus or minus 0.0005-inch. Coolant system continuously removes chips and sludge. Built into each wheel head is a solenoid-operated electric wheel dresser.

Check No. 4 on Reply Card for more Details

Deburring Separator

Burrs are removed from machined parts without affecting close tolerances by the combination deburring barrel and separator announced by Belke Mfg. Co., 947 North Cicero Ave., Chicago 51, Ill. The uniform finish attained is satisfactory for painting, many types of electroplat-



ing and as preparation prior to burnishing. Illustrated barrel has two independent compartments; one, three and four compartment models also are available.

Barrel is rotated by an enclosed variable speed drive. A hand crank regulates speed between 13 and 39 revolutions per minute. Any speed ranges based on a 1 to 3 or 1 to 4 ratio can also be furnished. As barrel

is emptied, the load slides down a chute into the motor driven separator which sorts work and media. A separating screen in the hopper bottom is mounted on an easily removable wood frame which prevents work from hitting the hopper's steel sides as it oscillates.

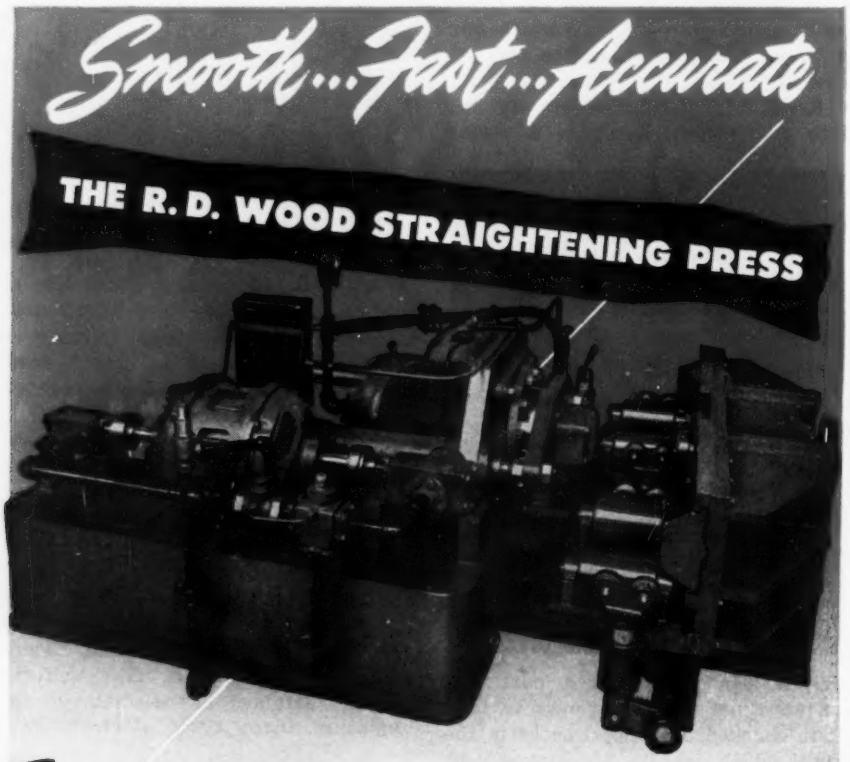
Check No. 5 on Reply Card for more Details

Fatigue Tester

Baldwin Locomotive Works, Philadelphia 42, Pa., is announcing a fatigue testing machine designed to subject turbine blades and materials to fatigue loads under conditions similar to those in high temperature turbine service. It applies alternating flexure loads up to plus or minus 1350 pounds to a specimen at a frequency of 3600 cycles per minute while it is held at temperatures up to 1800°F and is under tensile loads up to 8000 pounds.

Known as the Sonntag SF-5, the machine's flexure loads are applied by the centrifugal force of a mass rotating at constant speed in an oscillating frame. The force is accurately controlled by varying the distance between the mass and its center of rotation. Automatic controls maintain constant tension, stop the main motor if the specimen breaks, if creep exceeds 1/8-inch and if amplitude of oscillator exceeds the setting and endangers flex plate guides. Seismic springs prevent transmission of vibrations to the floor.

Check No. 6 on Reply Card for more Details



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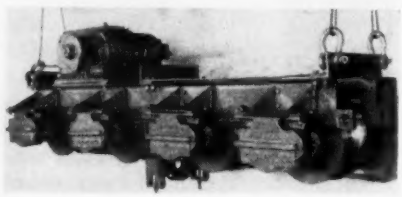
Magnetic Roll Conveyor

Magnetic Engineering & Mfg. Co., Clifton, N. J., is producing a magnetic pipe roll conveyor intended to increase production of galvanized pipe. It consists of a series of concave magnetic rolls electrically energized, built into the steel frame structure, with antifriction bearings and unit motor drive. Concave rollers are wound with glass covered wire, the



first roll being placed as near the spelter pot as possible.

In operation the operator raises a length of pipe from the kettle and contacts the first magnetic roll which propels the pipe through a steam blowing ring to remove excess spelter. Pipe contacts the second magnetic roll and is carried forward. For smooth pipe the roller incline varies from 12 to 14 degrees, for drainage. As it travels upward and finally reaches the last roll, it hits a trip which de-energizes one or two rolls supporting the pipe and it falls upon the cooling table.

Check No. 7 on Reply Card for more Details

Resistance Heater

Localized heating of objects 3/8 to 7/8-inch in diameter and from 1 to 7-1/2 inches long is possible with the model RH-1 resistance heating machine developed by Agnew Electric Co., Milford, Mich. Machine consists of a fabricated steel framework on which is mounted pneumatically operated work clamps, actuated by double-acting air cylinders. Clamps are connected to a 50 kilovolt-ampere resistance heating transformer through flexible secondary leads. Clamps, dies and transformer are water cooled.

Transformer is initiated by a pressure switch through a magnetic con-

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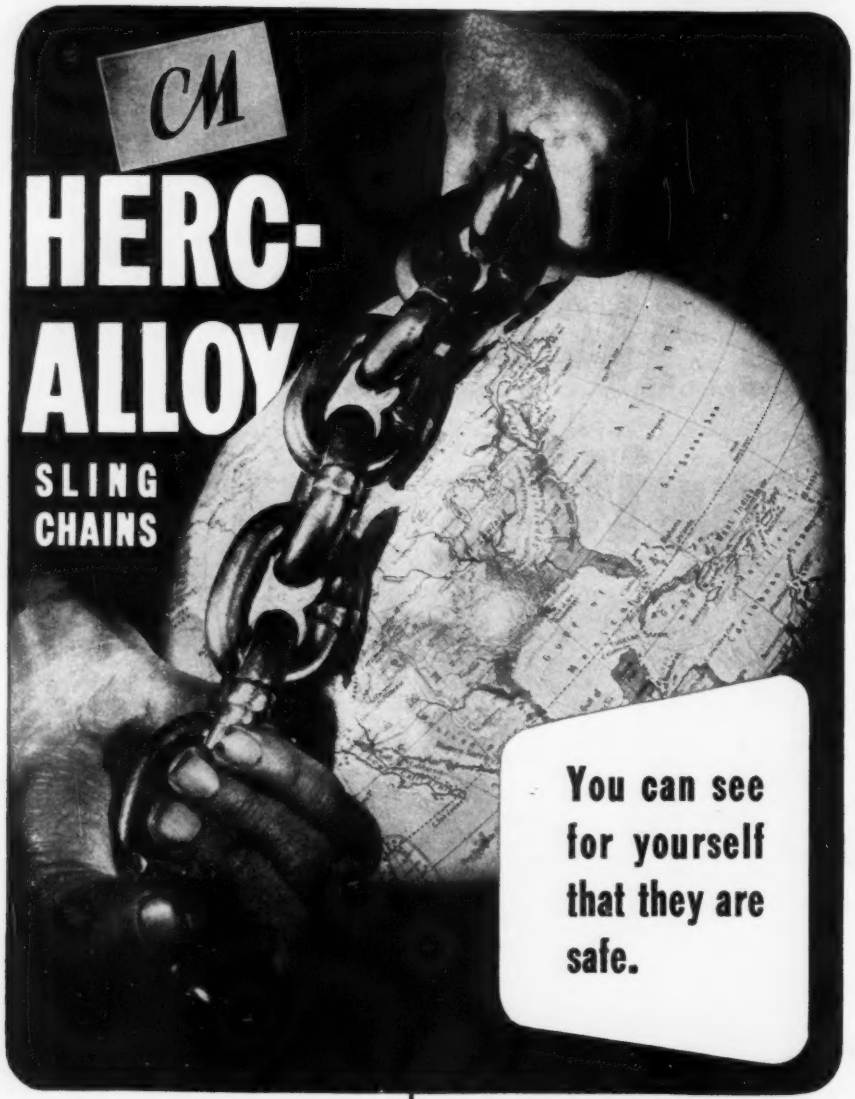

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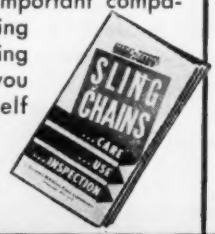

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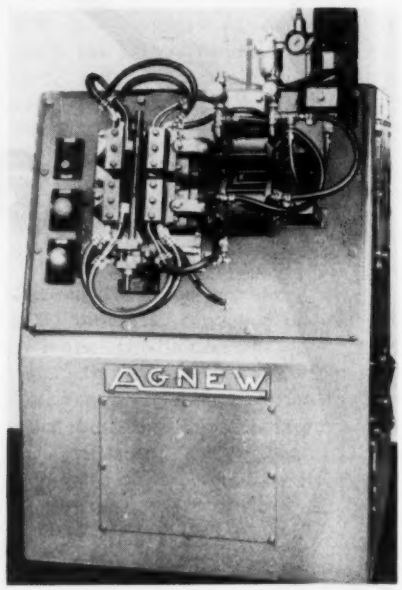
tactor. After a predetermined time has elapsed, the contactor is de-energized, turning off the transformer. Machine occupies a floor space 36 x 36 inches. Once the part has been placed in the machine and the start

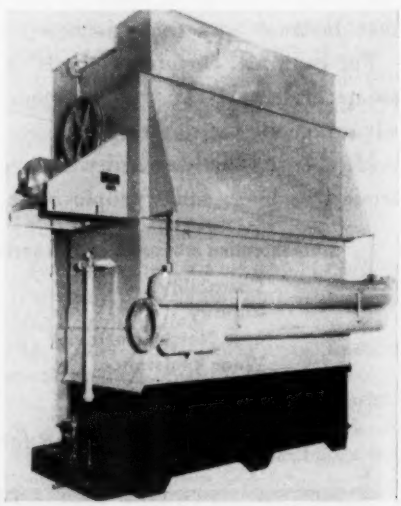


button depressed, the cycle is automatic. Machines may be in single or multiple station types and can be pneumatically, hydraulically or mechanically controlled.

Check No. 8 on Reply Card for more Details

After Cooler

Compressed air may be cooled, condensed and the water vapor contained in it removed with the improved design Aero after cooler, manufactured by Niagara Blower Co., 405 Lexing-



ton Ave., New York 17, N. Y. Principle of the cooler is the cooling of the compressed air, accomplished by passing it through coils in a spray chamber where atmospheric air is drawn through by fans, evaporating

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a portion of the recirculating spray water.

Greater efficiency is obtained by arranging the compressed air coils laterally across the spray chamber and introducing the compressed air through an oversize manifold located lengthwise on the outside of the casing. As the compressed air temperature reached is always lower than the dry bulb temperature of the ambient air, condensation of water in compressed air lines and tools is prevented. The after cooler replaces both shell and tube cooler and cooling tower.

Check No. 9 on Reply Card for more Details

Lock and Weld Nut

Projection weld nuts, used in production work where application of nuts to bolts is difficult because of lack of space or where metal sections are too thin, are available from Grip Nut Co., 308-N South Michigan Ave., Chicago 4, Ill. The application process is reversed, the nuts being welded in final position and the bolt screwed into the nut.

Problem of welding metal dropping into nut threads during the welding is eliminated in the Gripco 3-point weld nut by counterboring the bottom of the nut. Nut thickness is increased to compensate for threads removed by counterboring. Top of the nut is standard Gripco "double triangle" thread-locking design. When bolt is applied, it locks into the nut and is prevented from loosening.

Check No. 10 on Reply Card for more Details

Box Hand Truck

Manufactured to customers specifications are the new all-steel box type hand trucks for handling light parts,

developed by Palmer-Shile Co., 16025 Fullerton Ave., Detroit 27, Mich. Truck has four pneumatic tires, the two larger being stationary.

Maneuverability is attained by the two pivot wheels at the pushing end. Two hand levers at the pushing end permit the operator to unlock the box as the front bottom for parts disposal. Rectangular tubular at top and bottom of pushing end add to operating convenience and assist in lifting to empty.

Check No. 11 on Reply Card for more Details

Electron Diffraction Unit

An aid in the observing and measuring conditions on surfaces or in thin layers of materials such as metals, ceramics, plastics, organic films, etc., is the electron diffraction unit developed by RCA Victor Division of Radio Corp. of America, Camden, N. J. It permits the chemical analysis of substances weighing as little as 1/28 millionth of an ounce. Chemical composition and atomic arrangement of crystalline substances are revealed by directing a beam of electrons through a minute specimen, thus producing diffraction patterns which may be observed visually on a fluorescent plate or from a photographic print.

Provisions are included for producing diffraction patterns by either the reflection or the transmission method. Shadow micrographs may be pro-

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ALL TYPES

ALL METALS: Steel, Brass, Bronze, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)

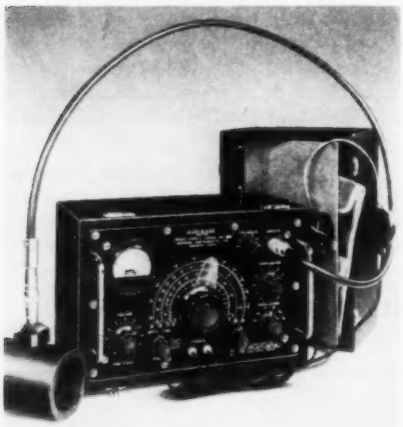
duced. Five external controls provide for positioning specimens up to 1 inch square at any angle. A transmission specimen holder which takes six specimens is provided so that it is possible to carry at all times a

calibration sample while unknowns are being studied. A built-in rock-steady camera is utilized for photographing diffraction patterns on 4 x 5 inch plates.

Check No. 12 on Reply Card for more Details

Thickness Detector

Branson Instruments Inc., Joe's Hill Rd., Danbury, Conn., is producing a new model Audigage thickness detector for the nondestructive measurement of steel, copper, aluminum, glass, unfilled plastics, etc., from one



side. Designated as model FMSS-5, it has the following features: Instrument indications for use in noisy locations, adjustable frequency modulation, permeability tuning unit for increased sensitivity over the whole frequency range, which is increased for measurement of steel down to 1/16-inch.

In operation an X-cut quartz crystal in the gage head, powered by an electronic oscillator, generates ultrasonic waves which are transmitted into material under test. Instrument is tuned to a frequency which produces resonance in the unknown thickness, being indicated simultaneously by a milliammeter and headphones to provide either visual or audible signals. Frequency at which resonance is indicated can be converted to thickness by a conversion scale on the instrument panel.

Check No. 13 on Reply Card for more Details

• • •

FLUX METER: For measuring alternating current, direct current and transit magnetic flux densities, model 327 Smith magnetic flux meter is offered by Associated Research Inc., Chicago 7, Ill. Unit uses a small probe which contains a copper constantan thermocouple. Standard range is 0 to 26,000 Gauss and special ranges are available.

Check No. 14 on Reply Card for more Details

GRINDING BELT: Behr-Manning, Troy, N. Y., offers a heat-resistant dry grinding belt, designated as Resinall Metalite. Belts are said to remain sharper for a longer period of time.

Check No. 15 on Reply Card for more Details

ACTUATING SWITCH: A splash-proof switch for actuating electric counters is announced by Production Instrument Co., Chicago 6, Ill. Actuating arm is nickel silver and shaped to count circular objects of ¾-inch or more in diameter without space between objects. Dimensions are length, 6 inches; width, 1⅞ inches; depth, 1-9/16 inches, not including operating arm.

Check No. 16 on Reply Card for more Details

HEAT EXCHANGERS: Ross Heater & Mfg. Co. Inc., Buffalo, N. Y., offers type BCF exchanger for diesels, gas engines, compressors, hydraulic machinery, blowers and other industrial applications.

Check No. 17 on Reply Card for more Details

WIRE CONTROL AND STRAIGTENER UNIT: Metco type 2W wire control and straightener unit announced by Metallizing Engineering Co. Inc., Long Island City 1, N. Y., features include all metal construction, ball type thrust bearing, adjustable parts equipped with thumb screws for easy adjustment, outer metal hoop keeps coil on reel and prevents wire from "riding off". It may be adjusted to accommodate any size coil.

Check No. 18 on Reply Card for more Details

WASHING MACHINE: An automatic lens washing machine is introduced by Industrial Washing Machine Corp., New Brunswick, N. J. The unit occupies a floor space 5 x 6 feet and utilizes a special cleaning agent containing suspended particles which bombard the lenses under pressure providing high-speed cleaning of 60 or more racks of lenses per hour.

Check No. 19 on Reply Card for more Details

SCREW DRIVERS AND NUT SETTERS: A line of 12 models of high-torque air screw drivers and nut setters in a range from 450 to 1100 revolutions per minute is offered by Aro Equipment Corp., Bryan, O. This includes pistol type and lever type air tools with a choice of positive clutch or friction clutch.

Check No. 20 on Reply Card for more Details

HARD FACING ELECTRODE: Lincoln Electric Co., Cleveland, O., has added two new tubular type shielded arc electrodes to its hard facing line. Faceweld No. 1 deposits a chromium carbide type alloy surface and is used for hard facing parts of plain carbon, low alloy or manganese steel. Faceweld No. 12 is an electrode of the same type as No. 1, but is designed for use where the hard faced surface must withstand extremely severe abrasion as well as some impact.

Check No. 21 on Reply Card for more Details

WIRE ROPE CUTTER: Pell Cable Cutter Co., San Francisco, Calif., offers a wire rope cutter with a maximum capacity of 1½-inch wire rope. Hydrashear model LC is of all steel construction and weighs only 70 pounds. It is manually operated.

Check No. 22 on Reply Card for more Details

GEAR GAGE: A stainless steel gear gage with a 20 degree pressure angle is offered by George Scherr Co., New York 12, N. Y. By rolling gage over teeth of a gear, operator can tell the pitch without an error.

Check No. 23 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

DEMAND— Development of soft spots in the economy is giving rise to increasing caution on the part of steel buyers. As a result, pressure on the mills shows signs of slight easing, and activity in the conversion ingot and gray markets is tapering off.

Significant operations cutbacks in some consumer durable goods lines, however, have not yet resulted in appreciable contraction in steel mill order volume and, as a general thing, trade opinion is that any slackening that may develop in steel over the remaining weeks of the year will be due primarily to seasonal influences.

BALANCE— Overall demand continues far in excess of supply. Pressure for flat-rolled products, for instance, is unrelieved to any noticeable extent despite the letdown in the home appliance industry, a large consuming outlet for this class of product. Whatever slack appears is quickly taken up from another direction and the steelmakers continue to feel it will be months before anything approaching reasonable supply-demand balance will be struck. Progressive improvement in supply conditions is expected, however, as pipelines fill.

STEEL BARS—As demand for carbon steel bars is the most diversified of all the major products any general slowing down in requirements due to slackening in metalworking might first be reflected in this item. Business in bar steel covers a greater cross-section of the consuming field than any other product. Consequently, it is likely to reveal more soft spots than any other product. Much would depend upon the character of the soft spots. If the bottom should drop out of some consumer durable goods lines, the effect in sheets, for instance, would likely be more pronounced than in bars.

ALLOCATIONS— More than 500,000 tons of steel are moving monthly on voluntary allocations and indications are this tonnage may be increased over coming months. Extension of major voluntary programs beyond the Feb. 28 expiration date of Public Law 395 assures no interruption in the movement of heavy tonnage to most of those industries favored by allocations. At the same time it looks as though several additional industries may be granted preference tonnage, and some existing programs may be enlarged substantially, such as railroad cars. The Office of Defense Transportation currently is pressing a demand for more steel to care for the production of 12,000 cars a month as against the present 10,000.

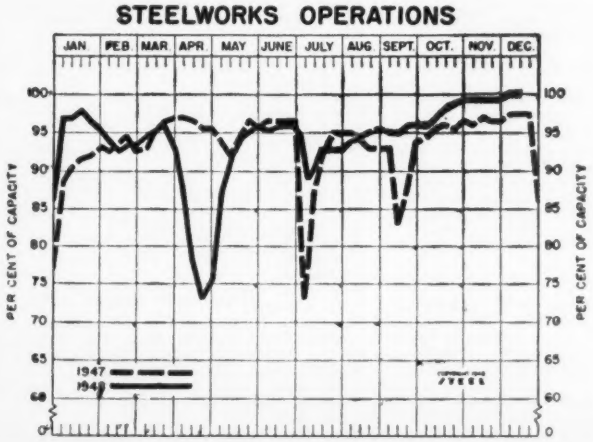
PRODUCTION—Steelmaking operations last week held close to the all-time high being scheduled at about 1,802,500 net tons compared with the previous week's record tonnage.

Indications are ingot output this year will set a new peacetime record of around 88,500,000 tons. In November output of ingots and castings was at the annual rate of 94,600,000 tons, or about 5 million tons more than in the best production year in history to date. Finished steel production is expected to exceed 65 million tons.

PRICES—Adjustments in individual producers' prices continue to be made but there is as yet no sign any general advance is in prospect. Expectations are nothing along this line is likely until the wage question is settled next spring. Last week the leading producer announced an increase of $11 to $19 per ton in contract tin plate prices effective Jan. 1. Other makers are expected to follow. At the same time current price developments are featured by higher prices on some alloys, principally silicon alloys, by a decline on foreign pig iron, and a noticeable easing in foundry grades of scrap.

COMPOSITES— STEEL'S arithmetical price composites held unchanged last week and compared with those for the like 1947 week as follows: Finished steel, $95.50 and $76.09; semi-finished steel, $75.75 and $57.20; steelmaking pig iron, $46.29 and $36.31; steelmaking scrap, $43.25 and $40.25.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended Dec. 11	Change	Same Week 1947	Same Week 1946
Pittsburgh	96.5	+ 0.5	102	69
Chicago	99	— 0.5	95.5	78
Eastern Pa.	97	None	93.5	63
Youngstown	105	None	102	50
Wheeling	97.5	+ 0.5	93.5	80.5
Cleveland	99.5	— 2.5	91.5	95
Buffalo	104	None	88.5	83.5
Birmingham	100	None	102	55
New England	89	— 1	85	90
Cincinnati	99	— 4	85	81
St. Louis	91.5	+ 2	89.5	72.5
Detroit	100	None	92	93
Estimated national rate	100	None	97.5	72.5

Based on weekly steelmaking capacity of 1,802,476 net tons for 1948; 1,749,928 tons for 1947; 1,762,381 tons for 1946.

COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Dec. 11	Dec. 4	Month Ago Nov. 1948	Year Ago Dec. 1947	5 Years Ago Dec. 1943
Finished Steel	$95.50	$95.50	$95.16	$76.15	$56.73
Semifinished Steel	75.75	75.75	75.75	57.20	36.00
Steelmaking Pig Iron	46.29	46.29	46.29	36.31	23.00
Steelmaking Scrap	43.25	43.25	43.25	40.13	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Nov. 1948	4.14340c
Oct. 1948	4.16150c
Sept. 1948	4.13446c
Nov. 1947	3.47537c
Nov. 1943	2.39672c

***STRAIGHT ARITHMETICAL COMPOSITES:** Computed from average industry-wide mill prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (re-rolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading producing points), and on Steelworks Scrap (No. 1 melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composites, dollars per net ton; pig iron and scrap, gross ton.

†**FINISHED STEEL WEIGHTED COMPOSITE:** Computed in cents per pound, mill prices, weighted by actual monthly shipments of following products, representing about 82 per cent of steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. November, 1948, figure is preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton, others dollars per gross ton. Delivered prices represent lowest from mills.

Finished Materials

	Dec. 11, 1948	Nov. 1948	Sept. 1948	Dec. 1947
Steel bars, Pittsburgh mills	3.45c	3.45c	3.45c	2.90c
Steel bars, del. Philadelphia	3.79	3.79	3.79	3.318
Steel bars, Chicago mills	3.35	3.35	3.35	2.90
Shapes, Pittsburgh mills	3.275	3.275	3.275	2.80
Shapes, Chicago mills	3.25	3.25	3.25	2.80
Shapes, del. Philadelphia	3.48	3.48	3.48	2.954
Plates, Pittsburgh mills	3.50	3.50	3.50	2.95
Plates, Chicago mills	3.40	3.40	3.40	2.95
Plates, del. Philadelphia	3.71	3.71	3.71	3.17
Sheets, hot-rolled, Pittsburgh mills	3.275	3.275	3.275	2.80
Sheets, cold-rolled, Pittsburgh	4.00	4.00	4.00	3.55
Sheets, No. 10 galv., Pittsburgh	4.40	4.40	4.40	3.90
Sheets, hot-rolled, Gary mills	3.25	3.25	3.25	2.80
Sheets, cold-rolled, Gary mills	4.00	4.00	4.00	3.55
Sheets, No. 10 galv., Gary mills	4.40	4.40	4.40	3.90
Strip, hot-rolled, Pittsburgh mills	3.275	3.275	3.275	2.80
Strip, cold-rolled, Pittsburgh mills	4.375	4.375	4.375	3.55
Bright basic, wire, Pittsburgh	4.325	4.325	4.325	3.675
Wire nails, Pittsburgh mills	5.775	5.775	5.775	4.625
Tin plate, per base box, Pitts. dist.	$6.70	$6.80	$6.80	$5.75

Semifinished

Sheet bars, mill	$67.00*	$67.00*	$67.00*	$53.57
Slabs, Chicago	52.00	52.00	52.00	40.18
Rerolling billets, Pittsburgh	59.00	59.00	59.00	40.18
Wire rod 7/32 to ¼-inch, Pitts. dist.	3.775c	3.775c	3.775c	3.05c

* Nominal.

Pig Iron

	Dec. 11, 1948	Nov. 1948	Sept. 1948	Dec. 1947
Bessemer, del. Pittsburgh (N.&S. sides)	$48.08	$48.08	$48.08	$37.913
Basic, Valley	46.00	46.00	46.00	36.00
Basic, eastern del. Philadelphia	50.17	50.17	47.77	38.84
No. 2 fdry., del. Pgh. (N.&S. sides)	47.58	47.58	47.58	37.413
No. 2 fdry., del. Philadelphia	50.67	50.67	48.27	39.34
No. 2 foundry, Chicago	46.25	46.25	43.25	36.00
No. 2 foundry, Valley	46.50	46.50	43.50	36.50
Southern No. 2 Birmingham	43.38	43.38	43.38	34.88
Southern No. 2 del. Cincinnati	49.09	49.09	49.09	37.74
Malleable, Valley	46.50	46.50	43.50	36.50
Malleable, Chicago	46.50	46.50	43.50	36.50
Charcoal, low phos., fob Lyles, Tenn.	66.00	66.00	62.00	50.00
Ferromanganese, f.o.b. Etna, Pa.	163.00	163.00	148.00*	151.00*

* F.o.b. cars Pittsburgh.

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$42.75	$42.75	$42.75	$40.00
Heavy melt. steel, No. 2, E. Pa.	41.50	41.50	41.50	41.625
Heavy melt. steel, No. 1, Chicago	41.75	41.75	41.75	38.75
Heavy melt. steel, No. 1, Valley	42.75	42.75	42.75	39.75
Heavy melt. steel, No. 1, Cleveland	42.25	42.25	42.25	39.25
Heavy melt. steel, No. 1, Buffalo	48.50	48.50	48.15	42.50
Rails for rerolling, Chicago	71.50	69.50	64.50	58.625
No. 1 cast, Chicago	70.50	70.50	71.10	55.875

Coke

Connellsville, beehive furnace	$14.50	$14.50	$14.50	$12.25
Connellsville, beehive foundry	17.00	17.00	17.00	14.50
Chicago, oven foundry, ovens	20.40	20.40	20.40	17.875

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $100-$105 per gross ton. Forging quality, $50 per net ton, mill.

Alloy Steel Ingots: $51 per net ton, mill.

Rerolling Billets, Blooms, Slabs: $52 per net ton, mill, except $62, Conshohocken, Pa.; $66, Monessen, Pa.; sales by smaller interests on negotiated basis at $85 per gross ton, or higher.

Forging Quality Billets, Blooms, Slabs: $61 per net ton, mill, except: $68, Conshohocken, Pa., mill.

Alloy Billets, Slabs, Blooms: Rerolling quality, $63 per net ton, mill except: $70, Conshohocken, Pa.

Sheet Bars: $67 nom., per net ton, mill; sales in open market $110-$115 per gross ton.

Skelp: 3.25c per lb, mill.

Tube Rounds: $76 per net ton, mill; some sellers quoting up to $120 per gross ton.

Wire Rods: Basic and acid open-hearth, 7/32 & ⅜-inch, inclusive, 3.40c per lb, mill, except: 3.65c, Struthers, O.; 3.70c, Worcester, Mass.; 4.05c, Pittsburg, Calif.; 4.10c, Portsmouth, O., Los Angeles; 4.15c Monessen, Pa. One producer quotes 3.90c, Chicago base. Basic open-hearth and bessemer, not resulphurized, 7/32 to 47/64-inch, inclusive, 3.50c, mill.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in. (Base 20 tons one size): 3.35c, mill, except: 3.55c, Ecorse, Mich., Pittsburgh, Monessen, Aliquippa, Pa.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, S. San Francisco, Los Angeles, Niles, Calif., Portland, Oreg., Atlanta, Seattle; 4.20c, Kansas City, Mo.; 4.25c, Minnequa, Colo.; 5.30c, Fontana, Calif.

Rail Steel Bars: (Base 10 tons): 3.35c, Moline, Ill., 5.10c, Williamsport, Pa.; another interest quotes 5.35c, mill.

Hot-Rolled Alloy Bars: 3.75c, mill. except: 4.05c, Ecorse, Mich.; 4.80c, Los Angeles; 5.50c, Fontana, Calif.

Hot-Rolled Alloy Bar Shapes: 4.00c, mill.

Cold-Finished Carbon Bars (Base 40,000 lb and over): 4.00c, mill, except: 3.95c, Pittsburgh, Cumberland, Md.; 4.20c, Indianapolis; 4.25c, Monessen, Pa.; 4.30c, Ecorse, Mich.; 4.40c, Newark, N. J., Hartford, Putnam, Conn., Mansfield, Readville, Mass.; 4.45c, Camden, N. J.; 5.30c, Los Angeles.

Cold-Finished Alloy Bars: 4:65c, mill, except: 4.75c, Monessen, Pa.; 4.85c, Indianapolis; 4.95c, Worcester, Mansfield, Mass., Hartford.

High-Strength, Low-Alloy Bars: 5.10c, mill, except; 5.40c, Ecorse, Mich.

Reinforcing Bars (New Billet): 3.35c, mill, except: 3.55c, Monessen, Pa.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, Atlanta, Seattle, S. San Francisco, Los Angeles; 4.25c, Minnequa, Colo. Fabricated: To consumers: 4.25c, mill, except: 5.00c, Seattle.

Reinforcing Bars (Rail Steel): 4.65c, Williamsport, Pa., mill; another interest quotes 5.35c, mill.

Wrought Iron Bars: Single Refined: 8.60c, (hand puddled), McKees Rocks, Pa.; 9.50c, Economy, Pa. Double Refined: 11.25c (hand puddled), McKees Rocks, Pa., 11.00c, Economy, Pa. Staybolt: 12.75c, (hand puddled), McKees Rocks, Pa.; 11.30c, Economy, Pa.

Sheets

Hot-Rolled Sheets (18 gage and heavier): 3.25c, mill, except: 3.25-3.30c, Cleveland; 3.30c, Pittsburgh; 3.45c, Ecorse, Mich.; 3.95c, Pittsburg, Torrance, Calif.; 5.00c, Conshohocken, Pa.; 5.65c, Fontana, Calif.; 6.25c, Kansas City, Mo.

Hot-Rolled Sheets (19 gage and lighter, annealed): 4.15c, mill, except: 4.40c, Alabama City, Ala.; 4.65c, Niles, O., 5.05c, Torrance, Calif., Kokomo, Ind.

Cold-Rolled Sheets: 4.00c, mill, except: 4.20c, Ecorse, Mich.; 4.70c, Granite City, Ill.; 4.95c, Pittsburg, Calif.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) 4.40c, mill, except: 5.00c, Niles, O.; 5.15c, Pittsburg, Torrance, Calif.; 5.30c, Kokomo, Ind.

Galvannealed Sheets: 4.95c, mill, except: 5.05c, Indiana Harbor, Ind.; 5.55c, Niles, O.; 5.70c, Kokomo, Ind.

Culvert sheets, No. 16 flat Copper Steel (based on 5-cent zinc): 5.00c, mill, except: 5.40c, Granite City, Ill.; 5.45c, Kokomo, Ind.; 5.75c, Pittsburg, Torrance, Calif.

Long Ternes, No. 10 (Commercial quality): 4.80c, mill.

Enameling Sheets, No. 12: 4.40c, mill, except: 4.60c, Granite City, Ill.; 4.70c, Ecorse, Mich.; 6.00c, Niles, O.

Silicon Sheets, No. 24: Field: 5.15c, mill. Armature: 5.45c, mill, except: 5.95c, Warren, O.; 6.05c, Niles, O.

Electrical: Hot-rolled, 5.95c, mill, except: 6.05c, Kokomo, Ind.; 6.15c, Granite City, Ill. 6.45c, Warren, O.; 6.55c, Niles, O.

Motor: 6.70c, mill except: 6.90c, Granite City, Ill.; 7.20c, Warren, O.; 7.95c, Follansbee, W. Va., Toronto, O.; 9.20c, Brackenridge, Pa.

Dynamo: 7.50c, mill, except: 8.65c, Follansbee, W. Va., Toronto, O.; 7.70c, Granite City, Ill.; 10.00c, Brackenridge, Pa.

Transformer 72, 8.05c, mill, except: 9.15c, Follansbee, W. Va., Torronto, O.; 11.80c, Brackenridge, Pa. 65, 8.60c, mill, except: 9.85c, Follansbee, W. Va., Toronto, O.; 12.35c, Brackenridge, Pa.; 58, 9.30c, mill, except: 10.55c, Follansbee, W. Va., Toronto, O.; 13.05c, Brackenridge, Pa.; 52, 10.10c, mill, except: 11.35c, Follansbee, W. Va., Toronto, O.

High-Strength Low-Alloy Sheets: Hot-rolled, 4.95c, mill, except: 5.25c, Ecorse, Mich., and Conshohocken, Pa., mills.

Galvanized (No. 10), 6.75c, mill.

Cold-rolled, 6.05c, mill, except: 6.35c, Ecorse, Mich.

Strip

Hot-Rolled Strip: 3.25c mill, except: 3.30c, Cleveland, Pittsburgh, Riverdale, Ill.; 3.25-3.35c,* Sharon, Pa.; 3.45c, Ecorse, Mich., Atlanta; 3.60c, Detroit; 3.70c, West Leechburg, Pa.; 4.00c, Pittsburg, Torrance, Calif.; 4.25c, Seattle, S. San Francisco, Los Angeles; 4.20c, Kansas City, Mo.; 4.30c, Minnequa, Colo.; 5.90c, Fontana, Calif. One company quotes 4.90c, Pittsburgh base.

* Wider than 6-in. and 6-in. and narrower, respectively.

Cold-Rolled Strip (0.25 carbon and less): 4.00c, mill, except 4.00-4.25c, Warren, O.; 4.00-4.50c, Youngstown; 4.20c, Ecorse, Mich.; 4.25c, Riverdale, Ill.; 4.40-4.50c, Detroit; 4.50c, New Haven, Conn., West Leechburg, New Castle, Pa., Boston; 4.75c, Dover, O., New Kensington, Pa.; 4.50-5.00c, Trenton, N. J.; 4.80-5.05c, Wallingford, Conn.; 5.75c, Los Angeles; 7.10c, Fontana, Calif. One company quotes 4.55c, Cleveland or Pittsburgh base, and 4.75c, Worcester, Mass., base; another, 5.00c, Pittsburgh base.

Cold-Finished Spring Steel: 0.26-0.40 C, 4.00c, mill, except: 4.25c, Dover, O., Chicago; 4.30c, Worcester, Mass.; 4.50c, New Castle, Pa., Boston, Youngstown; 4.75c, Wallingford, Conn. Over 0.40 to 0.60 C, 5.50c, mill, except: 5.65c, Chicago; 5.75c, Dover, O.; 5.80c, Worcester, Mass., Wallingford, Conn., Trenton, N. J.; 5.95c, Boston; 6.00c, New Castle, Pa. Over 0.60 to 0.80 C, 6.10c, mill, except: 6.25c, Chicago; 6.35c, Dover, O.; 6.40c, Worcester, Mass., Wallingford, Bristol, Conn., Trenton, N. J.; 6.60c, New Castle, Pa. Over 0.80 to 1.05 C, 8.05c, mill, except: 7.85c, Dover, O.; 8.20c, Chicago; 8.35c, Worcester, Mass., Bristol, Conn., Trenton, N. J. Over 1.05 to 1.35 C, 10.35c, mill, except: 10.15c, Dover, O.; 10.30c, Wallingford, Conn.; 10.50c, Chicago; 10.65c, Worcester, Mass., Trenton, N. J.

Cold-Rolled Alloy Strip: 9.50c, mill, except: 9.80c, Worcester, Mass.

High-Strength, Low-Alloy Strip: Hot-rolled, 4.95c, mill, except: 5.25c, Ecorse, Mich., mill. Cold-rolled, 6.05c, mill, except: 6.35c, Ecorse, Mich., mill.

Tin, Terne Plate

Tin Plate: American Coke, per base box of 100 lb, 1.25 lb coating $6.60-$6.80; 1.50 lb coating $6.80-$7.00. Pittsburg, Calif., mill $7.35 and $7.55, respectively, for 1.25 and 1.50 lb coatings.

Electrolytic Tin Plate: Per base box of 100 lb, 0.25 lb tin, $5.80-$6.00; 0.50 lb tin, $6.00-$6.20; 0.75 lb tin, $6.20-$6.40.

Can Making Black Plate: Per base box of 100 lb, 55 to 70 lb basis weight, $5.20-$5.30; 75 to 95 lb basis weight $5.10-$5.20; 100 to 128 lb basis weight $5.20-$5.30. $5.95, $5.85, $5.95, respectively, Pittsburg, Calif.

Holloware Enameling Black Plate: 29-gage, 4.75c per pound, except: 4.85c, Sparrows Point, Md.; 4.95c, Granite City, Ill.

Manufacturing Ternes (Special Coated): Per base box of 100 lb, $5.90, except: $6 Fairfield, Ala., Sparrows Point, Md.

Roofing Ternes: Per package 112 sheets; 20 x 28 in., coating I.C. 8-lb, $15.50.

Plates

Carbon Steel Plates: 3.40c, mill, except: 3.40-3.60c, Cleveland; 3.45c, Sparrows Point, Md., Johnstown, Pa., Lackawanna, N. Y.; 3.60c, Pittsburgh; 3.65c, Ecorse, Mich.; 3.75c., Coatesville, Pa.; 3.95c, Claymont, Del., Conshohocken, Pa.; 4.30c, Seattle, Minnequa, Colo.; 4.56c, Houston, Tex.; 5.80c, Fontana, Calif.; 6.50c, Harrisburg, Pa.; 6.25c, Kansas City, Mo.

Floor Plates: 4.55c, mill.

Open-Hearth Alloy Plates: 4.40c, mill, except: 5.10c, Coatsville, Pa., mill.

High-Strength, Low-Alloy Plates: 5.20c mill, except: 5.10c, Coatesville, Pa.; 5.30c, Conshohocken, Pa., Sparrows Point, Md., Johnstown, Pa.; 5.65c, Ecorse, Mich., Sharon, Pa.

Shapes

Structural Shapes: 3.25c, mill, except: 3.30c, Bethlehem, Pa., Lackawanna, N. Y., Johnstown, Aliquippa, Pa.; 3.85c, Torrance, Calif.; 4.15c, Minnequa, Colo.; 4.30c, Seattle, S. San Francisco, Los Angeles; 5.75c, Fontana, Calif.

Alloy Structural Shapes: 4.05c, mill.

Steel Sheet Piling: 4.05c, mill.

High-Strength, Low-Alloy Shapes: 4.95c, mill. except: 5.05c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.

Wire and Wire Products

Wire to Manufacturers (carloads): Bright, Basic or Bessemer Wire, 4.15c, mill, except: 4.25c, Sparrows Point, Md., Kokomo, Ind.; 4.45c, Worcester, Mass.; 4.50c, Monessen, Pa., Minnequa, Colo., Atlanta, Buffalo; 4.70c, Portsmouth, O.; 4.80c, Palmer, Mass.; 5.10c, Pittsburg, Calif.; 5.15c, S. San Francisco; 5.40c, Shelton, Conn. One producer quotes 4.50c, Chicago base; another, 4.50c, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Basic MB Spring Wire, 5.55c, mill, except: 5.30c, Portsmouth, O.; 5.65c, Sparrows Point, Md., Monessen, Pa.; 5.85c, Worcester, Palmer, Mass., Trenton, N. J.; 6.50c, Pittsburg, Calif.

Upholstery Spring Wire, 5.20c mill, except: 5.30c, Sparrows Point, Md., Williamsport, Pa.; 5.50c, Worcester, Mass., Trenton, N. J., New Haven, Conn.; 6.15c, Pittsburg, Calif.

Wire Products to Trade (carloads): Merchant Quality Wire: Annealed (6 to 8 Gage base), 4.80c, mill, except: 4.90c, Sparrows Point, Md.; 4.95c, Monessen, Pa.; 5.10c, Worcester, Mass.; 5.15c, Minnequa, Colo., Kokomo, Ind.; 5.20c, Atlanta; 5.75c, S. San Francisco, Pittsburg, Calif. One producer quotes 5.15c, Chicago and Pittsburgh base; another, 5.20c. Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Galvanized (6 to 8 Gage base), 5.25c, mill, except: 5.35c, Sparrows Point, Md.; 5.40c, Monessen, Pa.; 5.55c, Worcester, Mass.; 5.60c, Kokomo, Ind., Minnequa, Colo.; 5.65c, Atlanta; 6.20c, Pittsburg, S. San Francisco, Calif. One producer quotes 5.60c, Pittsburgh and Chicago base; another, 5.65c, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Nails and Staples: Standard, cement-coated and galvanized nails and polished and galvanized staples, Column 103, mill, except: 105, Sparrows Point, Md., Kokomo, Ind.; 109 Worcester, Mass.; 110 Minnequa, Colo., Atlanta; 117, Portsmouth, O.; 123, Pittsburg, Calif.; 124, Cleveland; 126, Monessen, Pa.; $6.75 per 100 pound keg, Conshohocken, Pa., Wheeling, W. Va. One producer quotes column 109, Chicago and Pittsburgh base; another, column 113, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Woven Fence (9 to 15½ Gage, inclusive): Column 109, mill, except: 113, Monessen, Pa., Kokomo, Ind.; 116, Minnequa, Colo.; 121 Atlanta; 132, Pittsburg, Calif. One producer quotes column 113, Pittsburgh and Chicago base; another column 114, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Barbed Wire: Column 123 mill, except: 125, Sparrows Point, Md., Kokomo, Ind.; 126, Atlanta; 128, Monessen, Pa.; 130, Minnequa, Colo.; 143, Pittsburg, Calif.; 145, S. San Francisco. One producer quotes 127, Chicago and Pittsburgh base.

Fence Posts (with clamps): Column 114, Duluth; 115, Johnstown, Pa.; 116, Moline, Ill.; 122, Minnequa, Colo.; $123.50 per net ton, Williamsport, Pa.

Bale Ties (single loop): Column 106, mill, except: 108, Sparrows Point, Md., Kokomo, Ind.; 110, Atlanta; 113 Minnequa, Colo.; 130, S. San Francisco, Pittsburg, Calif. One producer quotes column 115, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Stainless Steels

(Mill prices, cents per pound)

CHROMIUM NICKEL STEELS

Type No.	Bars, Wire Shapes	Strip, Cold-Rolled	Sheets
301	28.50-28.75	30.50-32.00	37.50-40.75
302	28.50-28.75	33.00-33.75	37.50-40.75
303	31.00-31.50	36.50-39.75	39.50-43.00
304	30.00-31.25	35.00-35.75	39.50-43.00
316	46.00-48.00	55.00-57.25	53.00-57.25
347	38.50-39.75	48.50-50.25	50.00-54.00

STRAIGHT CHROMIUM STEELS

410	22.75-23.00	26.50-27.00	32.00-33.00
416	23.25-23.50	28.25-33.50	32.50-33.50
430	23.25-23.50	27.00-27.50	34.75-35.50
446	32.50-33.00	60.00-62.25	46.50-50.00

STAINLESS-CLAD STEELS

	Plates —Cladding— 10%	20%	Sheets —Cladding— 10%	20%
302	....	....	19.75	21.50
304	22.50	26.50	20.75	22.50
310	32.50	36.50	....	....
316	27.00	31.00	26.00	28.00
321	23.50	27.50	....	....
347	25.00	29.00	24.00	26.00
405	18.75	24.75	....	....
410	18.25	24.25	....	....
430	18.25	24.25	....	....

TOOL STEELS

Tool Steel: Cents per pound, producing plants; reg. carbon 19.00c; extra carbon 22.00c; special carbon 26.50c; oil-hardening 29.00c; high carbon-chromium 52.00c; chrome hot work, 29.00c.

W	Cr	V	Mo	Co	Base Per lb
18	4	1	...	...	90.50c
18	4	2	...	...	102.50c
18	4	3	...	...	114.50c
18	4	2	...	9	168.50c
1.5	4	1	8.5	...	65.00c
6.4	4.5	1.9	5	...	69.50c
6	4	3	6	...	88.00c

Tubular Goods

Standard Steel Pipe: Mill prices in carlots, threaded and coupled, to consumers about $200 a net ton.

In.	Butt Weld Blk.	Gal.	In.	Blk.	Gal.
⅛	39½-	10-	1 ——.	46-	26-
	41½	12½		48½	27
¼	37½-	11½-	1¼ ...	46½-	26½-
	39½	14		49	28
⅜	34-	6½-	1½ ...	47-	27-
	36	9		49½	28½
			2	47½-	27½-
½	40½-	19-		50	29
	43	21½	2½, 3..	48-	28-
¾	43½-	23-		50½	29½
	46	24½	3½ & 4	44½	22½

In.	Lap Weld Blk.	Gal.	Elec. Weld Blk.	Gal.	Seamless Blk.	Gal.
2	39½	17½	38½	16½	27-	5-
					38½	17
2½ ..	42½-	20½-	41½	19½	32½-	10½-
	43½	22½			41½	20
3	42½-	20½-	41½	19½	35-,	12-
	43½	22½			42½	21½
3½&4	42½-	21-	43½	21½	38½-	16½-
	46½	24½			43½	22
5 & 6	42½	24½	43½	21½	38½-	16½-
	44½	22½			43½	23
7	....	....	....	....	43½	20½

Line Steel Pipe: Mill prices in carlots to consumers about $200 a net ton.

In.	Butt Weld Blk.	Gal.	In.	Butt Weld Blk.	Gal.
⅛	40½	....	1¼ ...	46-	26-
¼	38½	....		48	27
⅜	35	....	1½ ...	46½-	26½-
½	40-	18½-		48½	27½
	42	19½	2	47-	26½-
¾	43-	22½-		49	28
	45	23	2½ & 3	47½-	27-
1	45½-	25½-		49½	28½
	47½	26	3½ & 4	43½	....

In.	Lap Weld Blk.	Gal.	Elec. Weld Blk.	Gal.	Seamless Blk.	Gal.
2	38½	16½	37½	15½	26-	4-
					37½	16
2½ ..	42½	20½	40½	19½	31½-	9½-
					40½	19
3 ...	42½	20½	40½	19½	34-..	12-
					40½	19
3½-4.	41½-	20-	42½	20½	37½-	15½-
	45½	23½			42½	21
5 & 6.	41½-	20	42½	20½	37½-	15½-
	43½				42½	21
8 ...	45½	....	44½	21½-	40½-	17½-
				22	44½	22
10 ..	45	....	44	21-	41½-	18½-
				21½	44	21½
12 ..	44	....	43	20	40½-	17½-
					43	20½

Standard Wrought Iron Pipe: Mill price in carlots, threaded and coupled, to consumers about $200 a net ton.

In.	Butt Weld Bulk	Gal.	In.	Lap Weld Bulk	Gal.
⅜...	+59½	+95½	1¼..	+22	+53
½...	+20½	+52½	1½..	+15½	+45½
¾...	+10½	+41½	2....	+ 7½	+36½
1 and			2½-3½	+ 5	+32
1¼	+ 4½	+32½	4....	List	+26
1½..	— 1½	+29	4½-8	+ 2	+27½
2....	— 2	+28½	9-12.	+12	+37

Boiler Tubes: Net base c.l. prices, dollars per 100′, mill; minimum wall thickness, cut lengths 4 to 24″; inclusive.

(Following prices on seamless boiler tubes raised 10% by Babcock & Wilcox Tube Co. as of Nov. 22.)

O.D. In.	B.W. Ga.	Seamless Hot Rolled	Seamless Cold Drawn	Elec. Weld Hot Rolled	Elec. Weld Cold Drawn
1	13	....	13.39	13.00	13.00
1¼	13	....	15.87	13.21	15.39
1½	13	$15.05	17.71	14.60	17.18
1¾	13	17.11	20.15	16.60	19.54
2	13	19.18	22.56	18.60	21.89
2¼	12	23.54	27.70	22.83	26.88
2½	12	25.79	30.33	25.02	29.41
2¾	12	27.33	32.14	26.51	31.18
3	12	28.68	33.76	27.82	32.74
3¼	11	33.39	39.29	32.39	38.11
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

Pipe Cast Iron: Class B, 6-in. and over, $93.50 per net ton, Birmingham; $106.70, del. Chicago; 4-in. pipe, $5 higher; Class A pipe, $5 a ton over Class B.

Rails, Supplies

Rails: Standard, over 60-lb; $3.20 per 100 lb, mill, except: $3.50, Indiana Harbor, Ind.

Light (billet): $3.55 per 100 lb, mill, except: $4.25, Minnequa, Colo.

Light (rail steel): $5.10 per 100 lb, Williamsport, Pa.

Railroad Supplies: Track bolts, treated: $8.50 per 100 lb, mill. Untreated: $8.25, mill.

Tie Plates: 4.05c mill, except: 4.20c, Pittsburg, Calif.; 4.50c, Seattle.

Splice Bars: 4.25c, mill.

Standard Spikes: 5.35c, mill, except: 5.25c, Pittsburgh.

Axles: 5.20c, mill.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., furnace	$48.00	$48.50	$49.00	$49.50
Newark, N. J., del.	50.39	50.89	51.39	51.89
Brooklyn, N. Y., del.	....	52.40	52.90	....
Philadelphia, del.	50.17	50.67	51.17	51.67
Birmingham, furnace	42.88	43.38	....	....
Cincinnati, del.	....	49.09	....	....
Buffalo, furnace	*47.00	*47.00	*47.50	48.00
Boston, del.	55.42	55.42	55.92	....
Rochester, del.	49.22	49.22	49.72	50.22
Syracuse, del.	50.025	50.025	50.525	41.025
§**Chicago,** district furnaces	46.00	46.00-46.50	46.50	47.00
Milwaukee, del.	47.72	47.72-48.22	48.22	48.72
Muskegon, Mich., del.	....	50.98-51.48	51.48	....
Cleveland, furnace	46.00	46.50	46.50	47.00
Akron, del.	48.17	48.67	48.67	49.17
Lone Star, Tex., furnace	....	†75.00	....	....
Duluth, furnace	....	46.50	46.50	47.00
Erie, Pa., furnace	46.00	46.50	46.50	47.00
Everett, Mass., furnace	....	49.50	50.00	....
Geneva, Utah, furnace	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	53.63	....	....
Portland, Oreg., del.	....	53.63	....	....
Los Angeles, San Francisco	53.13	53.63	....	....
Granite City, Ill., furnace	47.90	48.40	48.90	....
St. Louis, del.	48.65	49.15	49.65	....
Ironton, Utah, furnace	....	46.50	....	....
‡**Neville Island, Pa.,** furnace	46.00	46.50	46.50	47.00
Pittsburgh, del., N.&S. Sides	47.08	47.58	47.58	48.08
Pittsburgh (Carnegie), furnaces	46.00	....	....	47.00
Sharpsville, Pa., furnace	46.00	46.50	46.50	47.00
Steelton, Pa., furnace	48.00	48.50	49.00	49.50
Struthers, O., furnace	42.50	....	....	....
Swedeland, Pa., furnace	50.00	50.50	51.00	....
Toledo, O., furnace	46.00	46.50	46.50	47.00
Cincinnati, del.	50.55	51.05	....	....
Youngstown, O., furnace	46.00	46.50	46.50	47.00
Mansfield, O., del.	49.87	50.37	50.37	50.87

* Republic Steel Corp. quotes $1 a ton higher for basic, No. 2 foundry and malleable at Buffalo.

† Low phosphorus southern grade.

‡ To Neville Island base add: $0.86 for McKees Rocks, Pa.; $1.31 Lawrenceville, Homestead, McKeesport, Monaco; $1.73 Verona; $1.94 Brackenridge; $1.08 for Ambridge and Aliquippa.

§ Includes, in addition to Chicago, South Chicago, Ill., East Chicago, Gary and Indiana Harbor, Ind.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent Si (base)	$59.50		
6.51-7.00	60.75	9.01- 9.50	67.00
7.01-7.50	62.00	9.51-10.00	68.25
7.51-8.00	63.25	10.01-10.50	69.50
8.01-8.50	64.50	10.51-11.00	70.75
8.51-9.00	65.75	11.01-11.50	72.00

F.o.b. Jackson, O., per gross ton. Buffalo furnace $1.25 higher.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton. **Electric Furnace Silvery Pig Iron** Si 14.01-14.50%, $84.75 furnace, Niagara Falls; $84 open-hearth and $85 foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.45% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. F.o.b. furnace, Lyles, Tenn. ..$66 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Low Phosphorus

Steelton, Pa., $54; Buffalo, Troy, N. Y., $50; Philadelphia, $56.81 delivered.

Intermediate phosphorus, Central furnace, Cleveland, $51.

Differentials

Prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Fluorspar

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more $37; less than 60% $34.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$13.50-15.50
Connellsville, foundry	16.00-18.00
New River, foundry	16.50
Wise county, foundry	15.35
Wise county, furnace	14.60

Oven Foundry Coke

Kearney, N. J., ovens	$21.50
Chicago, ovens	20.40
Chicago, del.	†21.75
Detroit, del.	23.95
Terre Haute, ovens	21.00
Milwaukee, ovens	21.15
Indianapolis, ovens	20.85
Chicago, del.	24.00
Cincinnati, del.	21.40
Detroit, del.	24.40
Ironton, O., ovens	18.25
Painesville, O., ovens	20.90
Erie, del.	22.57
Cleveland, del.	22.46
Buffalo, del.	23.25
Birmingham, ovens	17.70
Philadelphia, ovens	20.55
Swedeland, Pa., ovens	20.50
Portsmouth, O., ovens	19.25
Detroit, ovens	20.65
Detroit, del.	*21.65
Flint, del.	22.85
Pontiac, del.	21.91
Saginaw, del.	23.15

Includes representative switching charge of: *, $1; †, $1.35.

Coal Chemicals

Spot, cents per gallon, ovens

(Price effective as of Aug. 5)

Pure benzol	20.00
Toluol, one degree	20.50-26.50
Toluol, two degrees	23.00-26.50
Industrial xylol	20.50-26.50

Per ton bulk, ovens

Sulphate of ammonia	$45.00

Per pound, ovens

(Effective as of Oct. 1)

Phenol, 40 (car lots, returnable drums)	13.50
Do., less than carlots	14.25
Do., tank cars	12.50

(Effective as of Oct. 25)

Naphthalene flakes, balls, bbl to jobbers, "household use"	13.75

Refractories

(Prices per 1000 brick, f.o.b. plant)

Fire Clay Brick

Super Duty: St. Louis, Vandalia, or Farber, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., $100.

High-Heat Duty: Salina, Pa., $85; Woodbridge, N. J., St. Louis, Farber, or Vandalia, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, Haldeman, or Athens, Ky., Troup, Tex., Stevens Pottery, Ga., or Portsmouth, O., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Pa., Bessemer, Ala., $66.

Ladle Brick

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa.; Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.

Wire Cut: $53, Chester, New Cumberland, W. Va., Wellsville, O.

Malleable Bung Brick

St. Louis, Mo., Olive Hill, Ky., $83; Beach Creek, Pa., $73.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa. $85; Joliet or Rockdale, Ill., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., $81.

Basic Brick

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Chrome brick or chemical-bonded chrome brick, $69, magnesite brick, $91; chemical-bonded magnesite, $80.

Magnesite

(Base prices pet net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; Bulk, $31; single paper bags, $35.50.

Dolomite

(Base prices per net ton)

Domestic, dead-burned bulk: Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Narlo, Millersville, Martin, Gibonsburg, Woodville, O., $11.85; Thornton, McCook, Ill., $11.95; Dolly Siding, Bonne Terre, Mo., $12.05.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural) Lower Lake Ports

(Any increase or decrease in R. R. freight rates, dock handling charges and taxes thereon effective after Apr. 1, 1948, are for buyer's account.)

Old range bessemer	$6.60
Old range nonbessemer	6.45
Mesabi bessemer	6.35
Mesabi nonbessemer	6.20
High phosphorus	6.20

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.25

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	15.00
Brazil iron ore, 68-69%	19.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26-$28

Manganese Ore

48-50%, duty paid, f.o.b. cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 67.60c-72.60c.

Chrome Ore

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	29.00-30.00
50% no ratio	29.50-30.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb. Mo., cont., Mines	$0.75

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS			STRIP		BARS				PLATES	
	H-R 10 Ga.	C-R 17 Ga.	Gal. *10 Ga.	†H-R	†C-R	H-R Rds. ⅜" to3"	C-F Rds. ½" & up	H-R Alloy **4140	Standard Structural Shapes	Carbon ⅝"-¾"	Floor ⅝" & Thicker
Boston (city)	5.84	6.64	7.84	6.04	6.90	5.69	6.39	8.24-9.74	5.54	5.80	7.34
Boston (c'try)	5.69	6.49	7.69	5.89	6.75	5.54	6.24	8.09-9.59	5.39	5.74	7.19
New York (city)	5.73-5.80	6.73	7.74-7.83	6.08-6.28	...	5.73	6.58	8.67	5.52-5.78	5.98	7.48
New York(c'try)	5.53-5.60	6.53	7.54-7.63	5.88-6.08	...	5.53	6.38	...	5.32-5.58	5.78	7.28
Phila. (city)	5.50-5.86	6.61-6.81	7.47-7.67	5.46-5.81	....	5.57-5.65	6.31	8.39	5.24-5.40	5.52-5.65	6.73-7.16
Phila. (c'try)	5.35-5.71	6.46-6.66	7.32-7.52	5.31-5.66	...	5.42-5.50	6.16	8.24	5.09-5.25	5.37-5.50	6.58-7.01
Balt. (city)	5.43†	6.33	7.18	5.49	...	5.54	...	...	5.48	5.68	7.18
Balt. (c'try)	5.28†	6.18	7.03	5.34	...	5.39	...	...	5.33	5.53	6.98
Norfolk, Va.	5.75	...	...	...	...	6.00	7.00	...	6.00	6.00	7.50
Wash. (w'hse)	5.81-5.97	...	...	5.87	...	5.88-5.92	6.58	...	5.82-5.86	6.02-6.06	7.47-7.51
Buffalo (del.)	5.20-5.25	5.95-6.00	7.75	5.70	6.50	5.35	6.05	9.50	5.25	5.60	7.70
Buff. (w'hse)	5.05-5.10	5.80-5.85	7.60	5.55	6.35	5.20	5.90	9.40	5.10	5.45	7.55
Pitts. (w'hse)	4.85-5.00‡	5.75-5.85[8]	7.15-7.70	5.00-5.35	5.95-6.00	4.90-5.10	5.65	7.65	4.90-5.15	5.05-5.25	6.55
Det. (w'hse)	4.85-5.00‡	5.75-5.85[8]	7.15	5.00-5.35	5.95-6.00	5.45	6.17	8.12	5.45	5.65-5.80	7.10
Cleveland (del.)	5.13-5.90‡‡	5.90-6.29	7.34-8.00‡‡	5.17-5.69	6.45-6.85	5.30-5.35	6.05-6.10	8.24-8.54	5.34-5.60	5.50-5.55	6.95-7.00
Cleve. (w'hse)	4.98-5.75	5.75-6.14	7.19-7.85	5.02-5.54	6.30-6.70	5.15-5.20	5.90-5.95	8.09-8.39	5.19-5.45	5.35-5.40	6.80-6.85
Cincin. (w'hse)	5.26	6.11	7.60	5.52	6.07	5.52	6.07	...	5.37	5.61	6.91
Chicago (city)	5.00-5.20	5.90‡[8]	7.30	5.00	6.64-6.80	5.05	5.85	8.25[9]	5.05	5.25	6.70
Chicago (w'hse)	4.85-5.05	5.75‡[8]	7.15	4.85	6.49-6.65	4.90	5.70	8.10[9]	4.90	5.10	6.55
Milwaukee (city)	5.37	6.07‡[8]	7.47	5.17	6.81-6.97	5.22	6.02	8.42[9]	5.22	5.42	6.87
St. Louis (del.)	5.34‡	6.24[8]	7.44	5.34	6.64	5.39	6.19[13]	6.64	5.39	5.59	7.04
St. L. (w'hse)	5.19‡	6.09[8]	7.29	5.19	6.49	5.24	6.04[13]	9.49	5.24	5.44	6.89
Birm'ham (city)	5.20‡	...	6.60	5.20	...	5.15	6.66	...	5.15	5.40	7.41-7.66
Birm'ham(c'try)	5.05‡	...	6.45	5.05	...	5.00	6.51	...	5.00	5.25	7.26-7.51
Omaha, Nebr.	6.07	...	9.33	6.07	...	6.12	6.92	...	6.12	6.32	7.77
Los Ang. (city)	6.55‡	8.05	8.20†	6.75	9.50	6.20	8.00-8.50	...	6.70	6.40	8.15
Los Angeles (w'hse)	6.40‡	7.90	8.05†	6.60	9.35	6.05	7.85-8.35	...	6.55	6.25	8.00
San Francisco	5.95[21]	7.15	8.05	6.75[21]	8.25[18]	5.90[21]	7.55	10.20‡‡	5.90	7.60	8.10
Seattle-Tacoma	6.35[17]	7.90[8]	8.40	6.70[17]	...	6.20[17]	8.15[1]	9.45[3]	6.30[17]	6.35[17]	8.40[19]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 39,999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [6]—400 to 14,999 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [13]—1000 lb and over; [18]—2000 lb and over; [17]—300 to 999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb; [23]—Price (but not other price in range) applies to any and all quantities.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § 18 gage and heavier; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ top level of quoted range is nominal.

Bolts, Nuts

Prices to consumers, f.o.b. midwestern plants. Sellers reserve right to meet competitors' prices, if lower. Additional discounts on carriage and machine bolts, 5 for carloads; 15 for full containers, except tire and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	35 off
⅝ and ¾ x 6-in. and shorter	37 off
¾-in. and larger x 6-in. and shorter	34 off
All diameters longer than 6-in.	30 off
Tire bolts	25 off
Plow bolts	47 off
Lag bolts, 6 in. and shorter	37 off
Lag bolts, longer than 6 in.	35 off

Stove Bolts

In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. f.o.b. Reg. and Heavy
⅛-in. and smaller	41 off	.....
¼-in. and smaller	.....	38 off
½-in.-1-in.	39 off	.....
⅝-in.-1-in.	.....	37 off
1⅛-in.-1½-in.	37 off	35 off
1⅝-in. and larger	34 off	28 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	46 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	40 off
¾, ⅞, & 1 x 6 and shorter	35 off

Square Head Set Screws

Upset 1-in. and smaller	51 off
Headless, ¼-in. and larger	31 off

Rivets

F.o.b. midwestern plants	
Structural ½-in. and larger	6.75c
⅞-in. and under	48 off

Washers, Wrought

F.o.b. shipping point, to jobbers..Net to $1 off

FERROALLOY PRODUCT PRICES

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $57, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn.) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $160 per gross ton of alloy, c.l., packed, $172; gross ton lots, packed, $187; less gross ton lots, packed, $204; f.o.b. Alloy, W. Va., Niagara Falls, N. Y.; or Welland, Ont. Base price; $165, Rockwood, Tenn.; $162, f.o.b. Birmingham and Johnstown, Pa., furnaces; $160, Sheridan, Pa.; $163, Aetna, Pa. Shipment from Pacific Coast warehouses on one seller add $31 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $201; less gross ton lots, $218 f.o.b. Chicago. Add or subtract $2 for each 1%, or fraction thereof, of contained manganese over 82% and under 78%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 26.0c, ton lot 27.1c, less ton 28.3c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c, Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload, 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.6c per lb of alloy, carload packed, 9.35c, ton lot 10.25c, less ton 11.25c. Freight allowed. For 2% C grade, Si 15-17.5%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., SMxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c less ton 26.0c. Delivered. Spot, add 0.25c

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.05% C 29.25c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, add C 1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lot 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Mn 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max. 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

SILICON ALLOYS

20-30% Ferrosilicon: Contract, carload, lump, bulk, 16.50-17.50c per lb of contained Si; packed 18.90c; ton lots 20.00c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 10.5c per lb of contained Si, carload

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Metal Price Tone Remains Firm

Actual bookings continue restricted by limited supplies which fail to meet consumers' requirements by a wide margin. Nickel output to set new peacetime high in 1948

New York—Nonferrous metal producers are still forced to restrict bookings due to continued shortage of supplies. Undertone of all major markets held firm last week.

Copper -- Only a few sellers have opened January books and practically all December metal has been sold, producing an unusually quiet market. A moderate tonnage of copper was sold last week on the basis of 23.50c, f.a.s. New York. No progress has been reported so far in settling the strike which has closed the Kennecott Copper Corp.'s properties in Utah since late last October.

Lead—Stocks of lead held by smelters and refiners as of Nov. 1 totaled 125,659 tons, or about 11,400 tons above the figure reported for Oct. 1, according to the American Bureau of Metal Statistics. The increase reflects the return to operations during October by the St. Joseph Lead Co. at the rate prevailing prior to the prolonged strike at the company's southeast Missouri properties. The Nov. 1 stocks were the largest reported since Jan. 1 of this year when the tonnage on hand amounted to 128,413 tons.

Stocks in ore and matte and in process at smelteries on Nov. 1 were up about 4500 tons to 66,481 tons while stocks in base bullion increased to 10,275 tons from 8506 tons on Oct. 1. Stocks of antimonial lead increased almost 4000 tons to 10,878 tons on Nov. 1, the largest tonnage reported in several years.

Receipts of lead in ore and scrap by smelters during October increased sharply to 44,862 tons from 29,247 tons in September.

Zinc — Only routine business was transacted in the domestic zinc market last week, although consuming demands continue to exceed supplies by a wide margin. Sellers are booking business for both December and January delivery. Supplies have been adversely affected this year by prolonged strikes, one of which is still unsettled at the beginning of the fifth month.

Tin — Applications for authority to import tin bearing alloys into the United States during the first quarter of 1949 must be on file by Dec. 29, the Department of Commerce has announced. Import license applications (form ODC 1041) should be addressed to the Tin and Antimony Section, Nonferrous Metals and Minerals Division, Office of Domestic Commerce, Room 1431, Tempo T Building, Washington 25.

Production of tin concentrates in the Netherlands East Indies in November amounted to the equivalent of 3089 tons, exceeding by 363 tons the previous postwar record. This lifts production in that area to the rate of 37,000 tons a year compared with a rate of only 21,000 tons a year ago. Only in 1937, 1940 and 1941 did the NEI production exceed 37,000 tons in any one year. Potential maximum capacity is estimated at 51,000 tons. The NEI output for the first 11 months amounted to 27,523 tons and the total for the year should be slightly over the goal of 30,000 tons which was set at the beginning of the year.

Output of refined tin by the Longhorn, Tex., smelter in November totaled 2900 tons compared with 2300 tons in October and 2759 tons in November, 1947. Output for the first 11 months came to 33,506 tons compared with 30,251 tons in the like 1947 period but well below the record of 40,259 tons established during the first 11 months in 1946.

United States imports of tin during the first eight months of this year consisted of 29,756 tons of tin metal and 26,229 tons of tin in concentrates. Bulk of the tin metal imports came from Malaya while bulk of the tin in concentrates came from Bolivia.

Nickel — Total world deliveries of Canadian nickel in all forms in 1948 will set a new high peacetime record, according to Robert C. Stanley, chairman, International Nickel Co. of Canada Ltd. The two previous peacetime peak years were 1947 and 1937.

Kennecott Awards Contract

New York—Kennecott Copper Corp. has awarded a construction contract, covering the installation of between five and six million pounds of sheet lead, lead pipe and other lead apparatus at Garfield, Utah, to the Andrews Knapp Construction Co. Inc., a wholly owned subsidiary of Knapp Mills Inc. The latter are producers of chemical and process equipment and lead-lined products. The new Kennecott copper refinery will have an initial capacity of 12,000 tons of refined copper a month.

Use of Tin in Plate Gains

WASHINGTON — Record-breaking production of tin plate and terne plate resulted in an increase of 18 per cent in tin consumption for these products in 1947, according to the Bureau of Mines. Tin plate output increased 39 per cent in 1947, and was 10 per cent more than the previous record of 1941. Hot-dipped tin plate production increased 9 per cent while electrolytic tin plate output increased 97 per cent. Nearly half the output in 1947 was electrolytic tin plate which requires much less tin to produce than tin plate by the hot-dip process. Expanded use of electrolytic tin plate in the manufacture of general line cans absorbed much of the increased output of this type of tin plate. However, about 40 per cent of the tin plate for canning food was of the thinner coated electrolytic, specified under container order M-81 for many important products including corn and peas. The food pack for 1947 was below the record established in 1946; but exports of tin plate attained a new high level in 1947, being 61 per cent more than 1946, and 3 per cent above the previous high of 1942. Tin used for terneplate increased 12 per cent, with greater output of short ternes and the tonnage of long ternes virtually unchanged from 1946.

The following summary of tin consumption by concerns producing tin plate and terneplate in 1946 and 1947 is released in advance of a final report now in preparation by the Bureau of Mines for the entire tin-consuming industry:

	1946 Long Tons	1947 Long Tons
Total tin on hand Jan. 1	10,372	11,380
Net receipts during year	28,723	32,210
Supply available for use	39,095	43,590
Minus tin on hand Dec. 31	11,380	10,752
Total tin processed	27,715	32,838
Minus tin content of scrap shipped from plants	778	820
Total tin consumed in manufacturing	26,937	32,018
Deduct plant losses	261	411
Tin content of manufactured products	26,676	31,607
Tin plate	26,127	30,980
Terneplate	446	501
Other products	103	126

The tin and terne plate industry acquired tin for its requirements in the following forms:

	1946 (Long tons)	1947 (Long tons)
Virgin pig tin	28,466	31,793
Tin in terne metal	257	417
Total	28,723	32,210

About 62 per cent (96 per cent in 1946) of the pig tin was obtained from the Longhorn smelter, and Straits brand accounted for 20 per cent (none in 1946).

Tin and terne plate plant stocks decreased 6 per cent in 1947, with pig tin inventories down 8 per cent. Tin on hand at the yearend was in the following forms:

	1947	1946	1945
Virgin pig tin	6,697	7,286	6,315
Tin in terne metal	134	169	160
Tin in plant scrap	253	263	228
Tin in process	3,668	3,668	3,669
Total (long tons)	10,752	11,380	10,372

New Copper Refinery Planned

London—Rhodesian Selection Trust and its subsidiary, Mufulira Copper Mines, plans to build a new £1,500,000 refinery at Mufulira in the northern Rhodesian copper belt. The refinery, which will have an initial capacity of 36,000 tons of electrolytic copper annually, will be designed in a manner to permit further expansion should conditions warrant. Construction plans and the placing of orders are well advanced, according to Chester Beatty, chairman. The refinery is expected to begin production of cathodes in 1952.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic, 23.50c, Conn. Valley; Lake, 23.62½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 22.00c; 88-10-2 (No. 215) 31.00c; 80-10-10 (No. 305) 27.25c; No. 1 yellow (No. 405) 17.50-18.00c.

Zinc: Prime western 17.50c, brass special 17.75c, intermediate 18.00c, East St. Louis; high grade 18.50c, delivered.

Lead: Common 21.30-21.35c, chemical and corroding 21.40c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, fob shipping point, freight allowed.

Secondary Aluminum: Piston alloy (No. 122 type) 26.50-27.00c; No. 12 foundry alloy (No. 2 grade) 26.00-26.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 28.00-30.00c; grade 2, 26.75-27.50c; grade 3, 25.75-26.50c; grade 4, 25.25-25.50c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, fob Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) $1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, $1.028; grade C, 99.65-99.79%, incl., $1.024; 99.5-99.649% $1.024, grade F, 98-98.999% $1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American 99-99.8% and over but not meeting specifications below, 38.50c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 39.00c, fob Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 46.00c; 25-lb pigs, 42.50c; shot nom.; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $79-$81 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2, del.; special or patented shapes, $2.10.

Cobalt: 97-98%, $1.65 per lb for 550 lb (keg); $1.67 per lb for 100 lb (case); $1.72 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 70.00c per ounce.

Platinum: $93-$96 per ounce.

Palladium: $24 per troy ounce.

Iridium: $110-$115 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill)

Sheet: Copper 37.18; yellow brass 34.59; commercial bronze, 95%, 37.23; 90%, 36.88; red brass, 85%, 36.04; 80%, 35.66; best quality, 35.33; nickel silver, 18%, 46.92; phosphor-bronze, grade A, 5%, 56.05.

Rods: Copper, hot rolled 33.28; cold drawn 34.28; yellow brass, free cutting, 38.16; commercial bronze, 95% 36.92; 90% 36.57; red brass, 85% 35.70; 80% 35.35.

Seamless Tubing: Copper 37.22; yellow brass 37.60; commercial bronze 90% 39.54; red brass 85% 38.92; 80% 38.57.

Wire: Yellow brass 34.88; commercial bronze, 95% 37.52; 90% 37.17; red brass, 85% 36.30; 80% 35.95; best quality brass 35.62.

Copper Wire: Bare, soft, fob eastern mills, c.l. 29.42½c, l.c.l. 29.92½-30.05c; weatherproof, fob eastern mills, c.l. 29.60-29.85c, l.c.l. 30.35c; magnet, delivered, c.l. 32.75-33.50c, 15,000 lb or more 33.00-33.75c, l.c.l. 33.50-34.25c.

ALUMINUM

Sheets and Circles: 2S and 3S mill finish c.l. (Two producers quote 1-cent per pound lower.)

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-20	36.8	33.4	39.5
0.008-0.0075	12-20	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	—Hexagonal— R317-T4	—Hexagonal— 17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	37.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, fob Cleveland, Pittsburgh)

Sheets: Full rolls, 140 sq ft or more, $27.25 per cwt.; add 50c per cwt., 10 sq ft to 140 sq ft. Pipe: Full coils, $27.25 per cwt; cut coils, $27.50. Traps and Bends: List price plus 80%.

ZINC

Sheets, 22.00-22.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 20.75-21.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 19.75-20.50c; over 12-in., 20.75-21.50c.

NICKEL

(Base prices, fob mill.)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, fob mill.)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb., 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9%, flake, fob Philadelphia, carloads, 26.00c; 5 tons and over 26.50c; 1 to 5 tons, 27.00c; less than 1 ton, 27.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed 33.84c; oval 33.34c; electrodeposited, 31.09c; cast, 30.12c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 46.00c, fob Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 16.00c; 1000 to 19,900 lb, 15.00c, fob Niagara Falls, N. Y.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25c; over 250 lb, 25.25c, fob Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; fob Cleveland. Add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 26.50c; 275-lb, or 500-lb bbl, 24.50c, fob Cleveland, freight allowed on barrels, or 3 or more kegs.

Tin Anodes: Bar, 1000 lb and over 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 200 lb, 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb, 121.75c; 200 to 499 lb, 122.25c; less than 200 lb, 123.75c fob Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8c; 100 or 300 lb drums only, 100 to 500 lb, 63.6c; 600 to 1900 lb, 61.2c; 2000 to 9900 lb, 59.4c. Prices fob Sewaren, N. J.

Zinc Cyanide: 100-lb drums 39.25c, fob Cleveland; 39.00c, Detroit; 38.00c, fob Philadelphia.

Stannous Sulphate: Less than 2000 lb, in 100 lb kegs, 100.00c, in 400 lb bbl. 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c, f.o.b. Carteret, Wis.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb fob shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.125	21.125	20.375
Yellow brass	18.875	18.625	18.125
Commercial Bronze			
95%	20.250	20.000	19.500
90%	20.125	19.875	19.375
Red brass			
85%	20.000	19.750	19.250
80%	19.875	19.625	19.125
Best Quality (71-79%)	19.750	19.500	19.000
Muntz Metal	18.250	18.000	17.500
Nickel, silver, 10%	20.250	20.000	10.000
Phos. bronze, A	22.625	22.375	21.375
Naval brass	18.750	18.500	18.000
Manganese bronze	18.750	18.500	17.875

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 20.75-21.00, No. 2 copper 19.75-20.00, light copper 18.75-19.00, composition red brass 17.25-17.50, auto radiators 14.50-14.75, heavy yellow brass 13.25-13.50, brass pipe, 14.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 21.75-22.00, No. 2 copper 20.75-21.00, light copper 19.75-20.00, refinery brass (60% copper), per dry copper content 19.25.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 19.00-19.50, No. 2 18.00-18.50, light copper 17.00-17.50, No. 1 composition red brass 15.25-15.50, No. 1 composition turnings 14.75-15.00, mixed brass turnings 8.75-9.00, new brass clippings 15.75-16.25, No. 1 brass rod turnings 12.75-13.25, light brass 8.75-9.25, heavy yellow brass 11.00-11.25, new brass rod ends 13.25-13.75, auto radiators, unsweated 12.75-13.00, cocks and faucets 12.25-12.50, brass pipe 12.75-13.25.

Lead: Heavy 19.50-20.00, battery plates 13.25-13.50, linotype and stereotype 19.50-20.00, electrotype 18.50-19.00, mixed babbitt 19.50-20.00, solder joints, 23.00-24.00.

Zinc: Old zinc 10.00-10.50, new die cast scrap 9.00-9.25, old die cast scrap 6.75-7.25.

Tin: No. 1 pewter 65.00-67.00, block tin pipe 83.00-84.00, No. 1 babbitt 51.00-54.00, siphon tops 50.00-52.00.

Aluminum: Clippings 2S 16.50-17.00, old sheets 13.00-13.50, crankcase 13.00-13.50, borings and turnings 6.50-7.00, pistons, free of struts, 13.00-13.50.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Nov. Avg.	23.50	21.325	16.580	103.00	17.00	38.50	40.00	73.655
Oct. Avg.	23.50	19.325	15.173	103.00	16.846	37.423	40.00	77.226
Dec. 1-6	23.50	21.30-21.35	17.50	103.00	17.00	38.50	40.00	70.00

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$42.50-43.00*
No. 2 Heavy Melt. Steel	42.50-43.00*
No. 1 Busheling	42.50-43.00*
Nos. 1, 2 Bundles	42.50-43.00
No. 3 Bundles	40.50-41.00
Machine Shop Turnings	37.50-38.00
Mixed Borings, Turnings	37.50-38.00
Short Shovel Turnings	38.00-40.00
Cast Iron Borings	39.50-40.00
Bar Crops and Plate	49.00-50.00
Low Phos. Steel	49.50-50.00
Heavy Turnings	39.50-40.00

Cast Iron Grades

No. 1 Cupola	65.00-66.00
Machinery Cast	72.00-73.00
Charging Box Cast	61.00-62.00
Heavy Breakable Cast.	60.00-61.00
Malleable	74.00-75.00
Brake Shoe	57.50-58.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.50-44.00
R.R. Malleable	75.00-80.00
Axles	55.25-56.25
Rails, Rerolling	59.00-60.00
Rails, Random Lengths	56.00-57.00
Rails, 3 ft and under.	60.00-61.00
Rails, 18 in. and under	61.50-62.00
Railroad Specialties	56.00-57.50
Uncut Tires	54.50-55.00
Angles, Splice Bars	53.00-54.00

* Plus applicable freight springboard.

CLEVELAND

No. 1 Heavy Melt. Steel	$42.00-42.50*
No. 2 Heavy Melt. Steel	42.00-42.50*
No. 1 Busheling	42.00-42.50*
Nos. 1 & 2 Bundles	42.00-42.50*
Machine Shop Turnings	37.00-37.50
Mixed Borings, Turnings	36.50-38.50
Short Shovel Turnings.	38.00-38.50
Cast Iron Borings	38.00-38.50
Bar Crops and Plate	47.00-47.50
Punchings & Plate Scrap	47.00-47.50
Heavy Turnings	42.00-43.00
Alloy Free Turnings	40.00-41.00
Cut Structurals	48.50-51.50

Cast Iron Grades

No. 1 Cupola	73.00-75.00
Charging Box Cast	60.00-62.00
Stove Plate	65.00-67.00
Heavy Breakable Cast.	57.00-62.00
Unstripped Motor Blocks	60.00-62.00
Malleable	78.00-80.00
Brake Shoes	55.00-57.00
Clean Auto Cast	73.00-75.00
No. 1 Wheels	64.00-66.00
Burnt Cast	59.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00-44.00*
R.R. Malleable	79.00-81.00
Rails, Rerolling	62.00-68.00
Rails, Random Lengths	60.00-61.00
Rails, 3 ft and under.	63.00-66.00
Cast Steel	55.00-57.00
Railroad Specialties	58.00-60.00
Uncut Tires	58.00-59.00
Angles, Splice Bars	61.00-63.00

* Plus applicable freight springboard on earmarked material.

VALLEY

No. 1 Heavy Melt. Steel	$42.50-43.00*
No. 2 Heavy Melt. Steel	42.50-43.00
No. 1 Bundles	42.50-43.00
Machine Shop Turnings	37.00-39.00
Short Shovel Turnings.	39.00-39.50
Cast Iron Borings	38.50-39.00
Low Phos.	48.50-50.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00-44.00*

* Plus applicable freight springboard.

MANSFIELD

Machine Shop Turnings	$37.50-38.00
Short Shovel Turnings.	39.50-40.00

CINCINNATI

No. 1 Heavy Melt. Steel	$42.00
No. 2 Heavy Melt. Steel	42.00
No. 1 Busheling	42.00
Nos. 1 & 2 Bundles	42.00
Machine Shop Turnings	36.00
Mixed Borings Turnings	36.00
Short Shovel Turnings.	38.00
Cast Iron Borings	37.00

Cast Iron Grades

No. 1 Cupola Cast	63.00
Charging Box Cast	53.00
Heavy Breakable Cast.	59.00
Stove Plate	55.00
Unstripped Motor Blocks	56.00
Brake Shoes	50.00
Clean Auto Cast	63.00
Drop Broken Cast	71.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00
R.R. Malleable	75.00
Rails, Rerolling	62.00
Rails, Random Lengths	58.00
Rails, 18 in. and under	63.00

DETROIT

(Brokers' buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$37.50-38.00
No. 1 Busheling	37.50-38.00
Nos. 1 & 2 Bundles	37.50-38.00
No. 3 Bundles	37.50-38.00
Machine Shop Turnings	31.50-32.00
Mixed Borings, Turnings	31.50-32.00
Short Shovel Turnings.	32.50-33.00
Cast Iron Borings	32.50-33.00
Punchings & Plate Scrap	42.50-43.00

Cast Iron Grades

No. 1 Cupola Cast	60.00-65.00
Heavy Breakable Cast.	54.00-59.00
Clean Auto Cast	60.00-65.00

BUFFALO

No. 1 Heavy Melt. Steel	$48.00-49.00
No. 2 Heavy Melt. Steel	41.75-42.25
No. 1 Busheling	41.75-42.25
No. 1 & 2 Bundles	41.75-42.25
Machine Shop Turnings	39.50-40.00
Mixed Borings, Turnings	39.50-40.00
Cast Iron Borings	39.50-40.00
Short Shovel Turnings.	40.50-41.00
Low Phos	49.00-51.00

Cast Iron Grades

No. 1 Cupola	67.00-68.00
Mixed Cupola	63.00-64.00
Heavy Breakable Cast.	55.00-57.00
Malleable	70.00-75.00
Clean Auto Cast	70.00-72.00

Railroad Scrap

Rails, 3 ft. and under.	59.00-61.00
Railroad Specialties	58.00-60.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$45.00-45.50
No. 2 Heavy Melt. Steel	41.50
No.1 Busheling	41.50
Nos. 1 & 2 Bundles	41.50
No. 3 Bundles	39.50
Machine Shop Turnings	37.50
Mixed Borings, Turnings	37.50
Short Shovel Turnings.	38.50-39.00
Bar Crop and Plate	49.00-51.00
Punchings & Plate Scrap	49.00-51.00
Cut Structurals	49.00-51.00
Elec. Furnace Bundles.	47.00-48.00
Heavy Turnings	45.50-46.50
No. 1 Chemical Borings	Nominal

Cast Iron Grades

No. 1 Cupola Cast	62.00-63.00
No. 1 Machinery Cast.	66.00-67.00
Charging Box Cast	62.00-62.50
Heavy Breakable Cast.	62.00-62.50
Unstripped Motor Blocks	59.50
Malleable	80.00-81.00
Clean Auto Cast	62.00-63.00
No. 1 Wheels	69.00-70.00

NEW YORK

(Brokers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$39.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	35.00
Machine Shop Turnings	29.00-29.50
Mixed Borings, Turnings	29.00-29.50
Short Shovel Turnings.	30.00-31.50
Punching & Plate Scrap	41.00-42.00
Cut Structurals	41.00-42.00
Elec. Furnace Bundles.	41.00-42.00

Cast Iron Grades

No. 1 Cupola Cast	57.00-58.00
Charging Box Cast	57.00-58.00
Heavy Breakable	58.00
Unstripped Motor Blocks	53.50-54.50
Malleable	68.00-69.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$38.90
No. 2 Heavy Melt. Steel	34.40
No. 1 Bundles	34.40
No. 1 Busheling	34.40
Machine Shop Turnings	29.90
Mixed Borings, Turnings	29.90
Short Shovel Turnings.	31.90
Bar Crops and Plate	40.00-41.00
Punching & Plate Scrap	40.00-41.00
Chemical Borings	38.00-39.00

Cast Iron Grades

No. 1 Cupola Cast	60.00-65.00
Heavy Breakable Cast.	55.00-58.00
Stove Plate	54.00-55.00
Unstripped Motor Blocks	50.00-52.00
Clean Auto Cast	54.00-56.00

CHICAGO

No. 1 Heavy Melt. Steel	$41.50-42.00
No. 2 Heavy Melt. Steel	41.50-42.00
No. 1 Bundles	41.50-42.00
No. 2 Bundles	41.50-42.00
No. 3 Bundles	39.50-40.00
Machine Shop Turnings	36.50-37.00
Mixed Borings, Turnings	36.50-37.00
Short Shovel Turnings.	38.50-39.00
Cast Iron Borings	37.50-38.00
Bar Crops and Plate	47.00-48.00
Punchings	48.00-49.00
Elec. Furnace Bundles.	44.50-45.00
Heavy Turnings	41.00-41.50
Cut Structurals	46.50-47.00

Cast Iron Grades

No. 1 Cupola Cast	70.00-71.00
Clean Auto Cast	70.00-71.00
No. 1 Wheels	60.00-62.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	45.00-46.00
Malleable	81.00-82.00
Rails, Rerolling	71.00-72.00
Rails, Random Lengths	59.00-60.00
Rails, 3 ft and under.	60.00-61.00
Rails, 18 in. and under	64.00-65.00
Railroad Specialties	55.50-56.50
Angles, Splice Bars	56.50-57.50

ST. LOUIS

No. 1 Heavy Melt. Steel	$44.00-45.00
No. 2 Heavy Melt. Steel	40.00-41.00
Machine Shop Turnings	35.00-36.00
Short Shovel Turnings.	36.50-37.50

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	65.00-66.00
Mixed Cast	56.00-58.00
Heavy Breakable Cast.	59.00-60.00
Brake Shoes	60.00-61.00
Clean Auto Cast	65.00-67.00
Burnt Cast	59.00-60.00

Railroad Scrap

R.R. Malleable	71.00-72.00
Rails, Rerolling	63.00-65.00
Rails, Random Lengths	56.00-59.00
Rails, 3 ft and under.	60.00-61.00
Uncut Tires	51.00-52.00
Angles, Splice Bars	54.00-56.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
Nos. 1 & 2 Bundles	39.00
No. 3 Bundles	37.00
Long Turnings	24.50
Short Shovel Turnings.	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	40.00
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	63.00
Stove Plate	60.00-62.00
No. 1 Wheels	59.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	nom.
Axles, Steel	50.00
Rails, Rerolling	53.00-55.00
Rails, Random Lengths	45.00-48.00
Rails, 3 ft and under.	53.00-55.00
Angles and Splice Bars	52.00-53.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$27.50
No. 2 Heavy Melt Steel	*27.50
No. 1 Busheling	*27.50
Nos. 1 & 2 Bundles	*27.50
No. 3 Bundles	*24.50
Machine Shop Turnings	*18.00
Bar Crops and Plate	*27.50
Cast Steel	*27.50
Alloy Free Turnings	*18.00
Cut Structurals	*27.50

Cast Iron Grades

No. 1 Cupola Cast	50.00-65.00

Railroad Scrap

No. 1 Heavy Melting	*28.50
Axles	*34.00
Rails, Random Lengths	*29.00

* Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$29.00-30.00
No. 2 Heavy Melt. Steel	29.00-30.00
No. 1 Busheling	29.00-30.00
Nos. 1 & 2 Bundles	29.00-30.00
No. 3 Bundles	24.50
Machine Shop Turnings	21.00-22.50
Mixed Borings, Turnings	21.00-22.50
Punchings & Plate Scrap	35.00
Cut Structurals	26.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	50.00
Heavy Breakable Cast.	35.00
Stove Plate	30.00
Unstripped Motor Blocks	32.50
Malleable	40.00
Brake Shoes	35.00
Clean Auto Cast	40.00
No. 1 Wheels	37.50-40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.50
Railroad Malleable	30.00
Rails, Random Lengths	30.00-32.00
Angles and Splice Bars	28.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$27.50
No. 2 Heavy Melt. Steel	27.50
Nos. 1 & 2 Bundles	27.50
Machine Shop Turnings	20.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles.	28.00

Cast Iron Grades

No. 1 Cupola Cast	50.00-55.00

HAMILTON, ONT.

(Ceiling prices, delivered)

Heavy Melt.	$23.00
No. 1 Bundles	23.00
Mechanical Bundles	21.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	23.00
Rails, Rerolling	26.00
Bushelings	17.50
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	48.00-50.00
No. 2 Cast	44.00-45.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.

FIRST AMERICAN SCRAP DRIVE

During the Revolutionary War, many local scrap drives were conducted. Loyal colonists gave their kettles and other iron ware for use in making guns and materials of war. Through every critical period in American history, scrap has always been in great demand. Today, 26,000,000 tons are needed annually to fill the requirements of industry.

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BUFFALO, N. Y. Genesee Bldg.	DETROIT, MICH. 2011 Book Bldg.	NEW YORK, N. Y. Woolworth Bldg.	READING, PA. Luria Bldg.
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GENERAL ELECTRIC

Sheets, Strip . . .

Jones & Laughlin Steel Corp. revises extras on hot-rolled sheets and strip

Sheet Prices, Page 148

Pittsburgh—Jones & Laughlin Steel Corp. adjusted extras on hot-rolled sheet and strip, effective as of Dec. 3, as follows: Gage and width extra table for sheets no longer lists extras for 3 widths classification within the ranges of over 12 to 23-15/16 inches; this thickness range is now grouped under one heading and extras raised $4 to $5 a ton. Advances for other width ranges are: Over 23-15/16 to 64 inches, $2; 64 to 68 inches, $3; 68 to 72 inches, $4; 72 to 78 inches, $6; over 78 inches, $7 a ton.

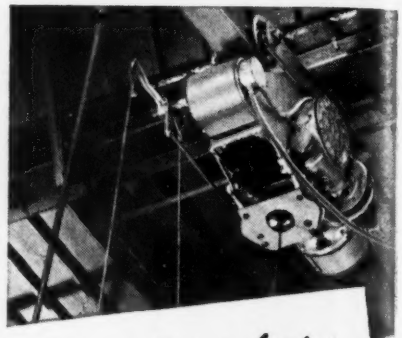
One series of cutting to length extras are now applicable to all gages up to 18 gage, inclusive, and include an extra of $2 a ton for length range over 60 to 168 inches, for which no charge was made previously; for length over 168 to 192 inches, an extra of 16 cents is now charged, compared with the former schedule of 10 cents for 17 and 18 gage and nothing for 16 gage or heavier. The cutting extra has been increased $3 a ton for lengths over 192 to 240 inches; $2 for over 240 inches.

Instead of the former flat charge of $5 a ton for pickling, this extra has been established on a gage basis with advances ranging from $1 to $5 a ton. New pickling extras follow: 9 gage and heavier, $6; 10 to 13 gage, $8; 14 to 18 gage, $10.

Adjustments in the company's hot-rolled strip extra card include a revision in gage and width extras ranging from $8 to $11 a ton for widths over 3/4-inch to 12 inches, inclusive. Pickling extras for widths over 6 to 12 inches, inclusive, have been advanced $2 to $4 a ton, except for 17 and 18 gages. Cutting extras were advanced $2 a ton for lengths over 48 to 60 inches, exclusive; $4 a ton for over 24 to 48 inches, inclusive.

New York — Most sellers of galvanized sheets and perhaps also the majority of producers of hot and cold-rolled carbon sheets have set up allotments for the entire first quarter. There are at least several sizable mills that have as yet taken no action beyond February on the latter products. Certain mills claim they are allocating as much first quarter tonnage for consumers here, on a monthly average basis, as they are doing in the current quarter. Carryovers into next year will amount to about the same as at the beginning of the present 3-month period. Some inland mills are steadily withdrawing to points nearer home, and, as a result, a number of buyers in this territory are likely to receive less from direct mill sources than heretofore. Eastern producers are likewise withdrawing from the more distant markets and this is being reflected in somewhat larger shipments here from these producers. However, this has not offset the amount of tonnage being withdrawn by Pittsburgh and midwestern mills.

Boston—Here and there spotty easing in pressure for flat-rolled steel is not definite enough to warrant assumption overall demand has



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—Yes, rock-bottom handling costs—*and* more output per hour! Here's the record: Heavy drums of chemicals had to be lifted to a raised vat—and lifted fast. The block and tackle formerly used required 3 men to get the proper lift speed. This 1/2-ton Reading Electric Hoist paid for itself in 2 months by keeping 2 men on their regular jobs and letting the third raise drums alone—in half the previous time! Let a Reading engineer help you get the same kind of handling results with a fast, smooth-working Reading Electric Hoist. Drop us a line today for full details. No obligation, of course.

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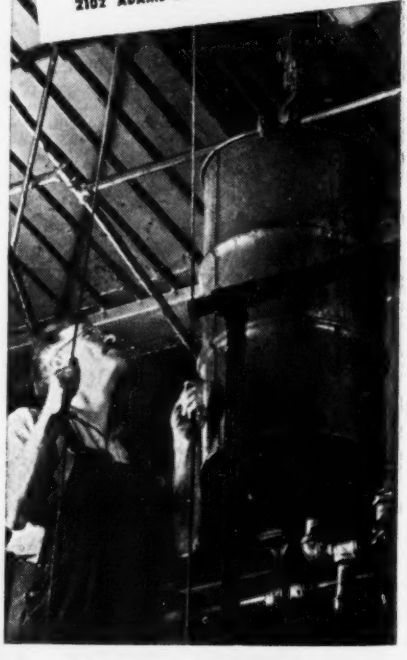


READING HOISTS

turned downward. There are more deferments, suspensions and indications that less steel will be required next quarter by some, but other consumers are seeking more tonnage. Overall there is no significant decline in estimated requirements, but a more spotty, uncertain policy in buying is developing. Year end inventory and a maze of confusing factors, political and economic, are contributing to this undertone; if mills were on schedule on shipments and deliveries, this situation would be better clarified. Gray marketeering premiums and business at warehouse levels are running into price resistance. Yet among flat-rolled products only stainless orders are solicited with some holding back on the part of consumers due to confused prices. Want of enameling sheets forces use of carbon cold-rolled as substitution; electrical sheet demand is below requirements, transformer and heavier electrical equipment needs balancing a slowing in those for motors. Certified allocations are likely to be heavier; light gage galvanized is well dented by housing requirements and if a grain storage program goes through another 50,000 tons is labeled.

Philadelphia—Stringency in enameling stock here has been made still more pronounced by the recent withdrawal of one mid-western producer for what appears to be the next few months at least. Despite the fact that manufacturers of some consumer durable goods, particularly stoves and certain types of refrigeration equipment, find an easing in demand, with backlogs shrinking, need for enameling stock still far exceeds supply. Substitutes for this material are far from satisfactory, and certain manufacturers fear they may have to curtail production temporarily pending readjustment of enameling stock supply.

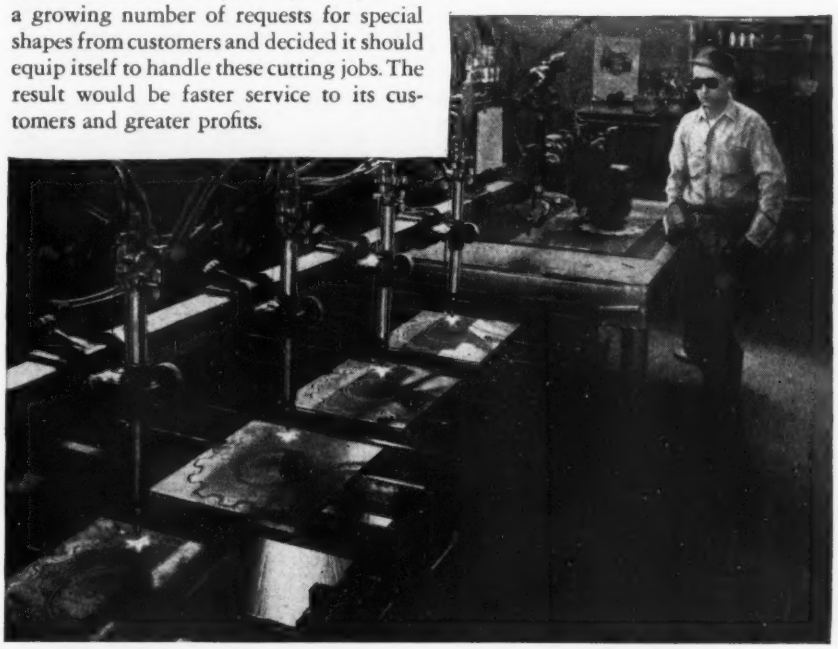
Somewhat increasingly mixed situation in consumer durable lines has had little or no discernible effect on pressure on sheet products generally. Overall demand still greatly exceeds supply, and producers believe that the time is far off when any reasonable balance will be reached. They believe that such slowing up as may develop in specifications in the immediate future will be chargeable more to seasonal influences than to anything else.

Chicago—A change in the make-up of customers for conversion tonnage is developing. A few household appliance manufacturers have withdrawn from these deals, while maintaining their demands for regular mill steel. Rolling capacity, however, is still sought after by other companies and the overall picture is unchanged. In two fields—washing machines and industrial trucks—several companies last week were reported scaling down their operations, either laying off employees, shifting them to other products or reducing their hiring rates. The number of companies which have practically filled their distributor pipelines, however, is more than offset by companies whose order backlogs stretch far into the future.

Fairly wide-spread action revising hot-rolled sheet and strip extras has at least one district mill busy studying its cost figures but so far no

Steel warehouse finds machine gas cutting helps fill special orders ...faster—at less cost

BRACE-MUELLER-HUNTLEY, INC., steel distributors in Syracuse, N. Y., noted a growing number of requests for special shapes from customers and decided it should equip itself to handle these cutting jobs. The result would be faster service to its customers and greater profits.



William Burkhardt, Airco Representative, was called in and he recommended machine gas cutting with an Airco No. 6B Oxygraph equipped with a four torch setup and an electronic tracing device.

The apparatus was quickly installed and put into operation. One-day service was offered to customers requiring intricate as well as ordinary shapes.

Company executives stated that the Oxygraph with the electronic tracing device enabled them to make additional profits and also to handle a wide variety of cutting jobs quickly and easily.

• • • •

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change has been made. The present sellers' market apparently allows extras to be determined wholely on a cost basis, without much regard for competitors' figures.

Cincinnati—Sheet quotas for the first quarter have been set up by the leading district interest, these showing some reduction in tonnage for those not covered in voluntary allocation programs. A factor in the reductions, although the total volume is not yet impressive, is the steady bookings for military purposes. These military needs are chiefly in hot and cold-rolled and galvanized. Specialties are not affected to any degree with exception of mill shifts to cover commitments on basic grades. Demand continues without surcease, even though requirements for some consumer goods appear lighter as reflected in minor cancellations or shipment cutbacks.

Birmingham — Pressure for sheet and scrap continues strong with speculation rife as to first-quarter schedules. Production problems continue to beset processors as mill quotas remain light and with little prospect of substantial improvement. One sizable user of sheets is preparing to leave the district due to the overall shortage of steel in this area.

St. Louis — First-quarter allocations for steel sheets in this district have been made. Allowance was made for probable continuance of the voluntary allocations program, with the result the totals were cut somewhat under those of the last quarter. In actual deliveries, however, these totals are likely to give customers greater tonnage. The reason for this apparent paradox is that allocations patterns were set up a year ago for each month. As production fell short, deliveries for four full months out of eight were skipped, rather than the orders backlogged. The new first-quarter pattern, therefore, has been scaled down to a figure calculated to insure deliveries each month and hence a greater total for the three months. Granite City's new cold reduction mill is picking up steadily and is now operating at 70 to 75 per cent of capacity. Sheet pressure may increase in the second quarter due to three major repair jobs on a new slab table and two turbines at Granite City Steel Co.'s mill.

Los Angeles—Sheet and strip users are feeling some momentary benefit from materials released with termination of the maritime strike. Forty-eight vessels are being unloaded in Los Angeles-San Pedro harbor. Aboard are considerable tonnages of steel in heavy categories, including some flat-rolled products. Sheet demand remains high.

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Semifinished Steel . . .

Semifinished Prices, Page 148

Pittsburgh — First indication of a slowing down of steel demand for consumer goods is expected to be reflected in an easing in pressure for conversion-deal ingots. Integrated steel producers state that the relatively few instances of slowing up in metal working operations which have been noted to date have not resulted in a reduction in mill allotments of steel to those companies affected. Those concerned, which find their deluxe models of household appliances accumulating in dealers' hands, have been forced to curtail output accordingly and are restricting production to lower priced models. Purchase of premium-priced steel in these instances is out of the question.

Tubular Goods . . .

Tubular Goods Prices, Page 149

Boston — While merchant steel pipe distribution north of Connecticut has been readjusted as to supply sources, consigned stock policy and prices, there is no loss of tonnage; as matter of fact, some additional tonnage is probable, but not sufficient to meet demand. Allotment levels are maintained and scattered carlots against spot demand are coming through. Distributor quotas are frequently far in excess of prewar, but demands on jobbers include orders which would normally go directly to mills. This includes utility buying, although the latter are still trying to place orders for much larger tonnages. Small lightwall steel tubing demand is slowing and some appliance makers, including a vacuum cleaner firm, are taking less tubing next quarter. Buying of cast pipe is high for this season, stimulated by extended deliveries against tonnage wanted for installation next spring and summer. Shortage of steel pipe has contributed some tonnage to cast iron foundries.

Steel Bars . . .

Bar Prices, Page 148

New York — An increasing number of hot carbon bar sellers have set up quotas for non-certified consumers for the entire first quarter. In virtually all cases, mills have set up allotments for at least the first two months. The amounts being allotted varies, but in general the average non-certified customer will get less tonnage in the first quarter than he is now receiving. In cold-drawn carbon bars, on the other hand, consumers likely will receive more because large cold drawers, who also have their own supply of hot material, are inclined to divert more production to this more profitable item. However, cold drawers have long since been out of the market for first quarter for most sizes of cold carbon bars. Deliveries on hot and cold alloy bars are fairly well extended, but can still be promised for late February in some cases.

Boston — Although subject to revision, carbon and alloy bar allocation for first quarter compare favorably with this quarter. Carryovers will be substantial and somewhat heavier volume is likely to be certified. Taking this into consideration, some producers will have slightly less tonnage open. Of the various classifications, cold-finished bar supplies are not too far out of balance with demand and reductions in warehouse allotments are less severe than in other carbon products. Most producers are soliciting orders for stainless. Mixed price structure in stainless retards some buying, both distributors and manufacturing consumers holding off for clarification. Hot-rolled bars are in short supply in more grades and sizes, reflecting heavy allocation to cold finishing departments, both integrated and nonintegrated; latter, however, are pushed to obtain tonnage to meet commitments. Small tool forge shops are slackening pressure for tonnage with the reverse true with those producing for the automotive and other affiliated industries.

Philadelphia — As demand for carbon steel bars is perhaps the most diversified of all the major steel products, any general slowing down in requirements due to slackening in metalworking activity might first be reflected in this material. However, if the bottom should drop out of some consumer durable lines, the effect in sheets, for instance, might be decidedly more pronounced than in bars. Also, being in less stringent demand than most other leading products, inventories of bars in the hands of manufacturing consumers should be found to be in better shape, and this factor would have to be considered in gaging the barometric importance of bars. At present, overall bar demand still surpasses supply, with local sellers reporting little easing which could be ascribed to anything other than seasonal influences.

Pittsburgh—Distribution pattern of alloy bars has been altered to extent of heavier tonnage requirements under the military voluntary allocation program. Overall steel requirements for this program approximate 102,000 tons monthly, much of which represents alloy bars. Considerable alloy bar tonnage also is being diverted into the chemical and petroleum industries, while better balanced sheet inventories among growing number of consumers have resulted in increased demand for alloy bar items. Advance of 11.3 cents per pound for 50 per cent ferrosilicon, recently announced by one producer, effective on contract shipments Jan. 1, is expected to result in higher production costs on alloy steel items. However, no increase in alloy bar prices is held imminent.

Los Angeles — Although consumers recently have noted improvement in available supplies of bar stock, the situation is now tighter with regard to alloy and cold-finished bars, and for the time being at least, material has become more difficult to obtain.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 148

Seattle — Rolling mill operations are concerned principally with reducing backlogs, one plant refusing further business before January. Many pending contracts will extend well into 1949. Demand for small tonnages of reinforcing bars continues unabated and pressure from contractors and other buyers is insistent.

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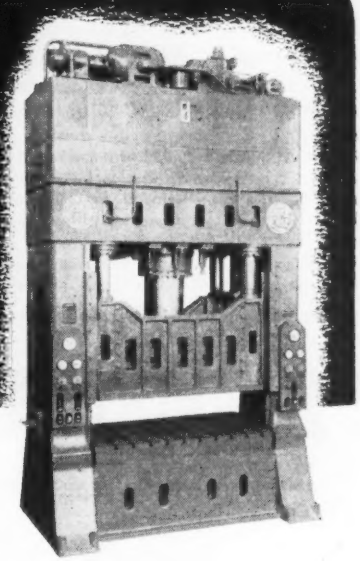

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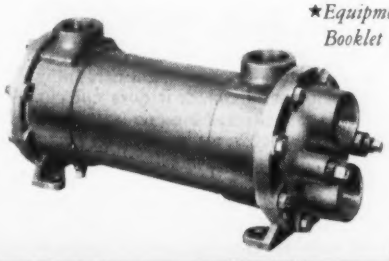

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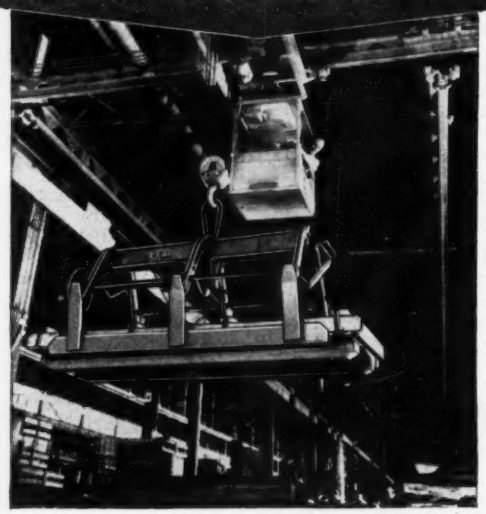

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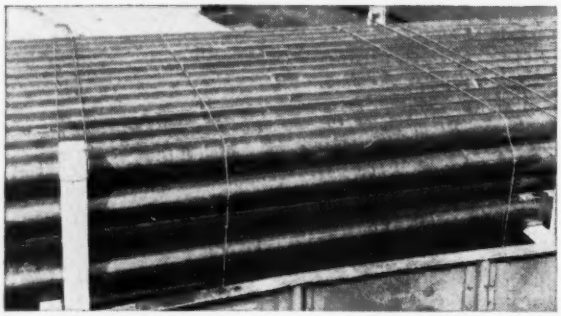

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1949 Tin Plate Prices Rise

Pittsburgh—Carnegie-Illinois Steel Corp. has announced higher prices for its tin mill products, effective Jan. 1 and applicable for all of 1949. The new prices per base box of 100 pounds basis weight at Irvin Works, Pittsburgh and Gary, Ind., plus the applicable switching or transportation charges in effect at time of shipment are shown in the following table:

	New	Old	Increase
Tin Plate, Electrolytic:			
0.25 lb. coating	$6.45	$5.80	$0.65
0.50 lb coating	6.70	6.00	0.70
0.75 lb coating	7.00	6.20	0.80
Tin Plate, Hot-Dipped:			
1.25 lb coating	7.50	6.60	0.90
1.50 lb coating	7.75	6.80	0.95
Manufacturing Ternes, Special Coated	6.65	5.90	0.75

Canmaking quality black plate, 55 pound to 128 pound basis weight, inclusive, is quoted at $5.75. Formerly this product was quoted on an area weight basis as follows: 55 to 70 lb, $5.20; 75 to 95 lb, $5.10; 100 to 128 lb, $5.20.

In 1939, the price base of 1.50 lb hot-dipped tin plate was $5 per base box, the company said. Ten years later, on Jan. 1, 1949, the price will be 55 per cent higher than in 1939, as a consequence of price increases made from time-to-time during these 10 years. But because of improvements in processes, including the development of electrolytic tin coatings of lighter weight, it is estimated that the weighted average price of tin mill products will be less than 45 per cent higher than in 1939.

Columbia Steel Co. also announced higher prices for 1949 as follows: Electrolytic tin plate, 0.25 lb coating, $7.20; 0.50 lb, $7.45; 0.75 lb, $7.75; hot-dipped tin plate, 1.25 lb coating (pot yield), $8.25; 1.50 lb, $8.50; canmaking quality black plate, 55 to 128 lb basis weight, inclusive, $6.50.

Tennessee Coal, Iron & Railroad Co. announced the following prices for 1949: Electrolytic tin plate, 0.25 lb coating, $6.55; 0.50 lb, $6.80; 0.75 lb, $7.10; hot-dipped tin plate, 1.25 lb, $7.60; 1.50 lb, $7.85; canmaking quality black plate, 55 to 128 lb basis weight, $5.85; special coated manufacturing ternes, $6.75.

Tin Plate . . .

Tin Plate Prices, Page 149

Pittsburgh—On the basis of increased costs, price levels for tin mill products are being established for 1949 delivery. Increased pressure for tin plate shipments is attributed in part to effort of consumers to augment stocks as much as possible before higher prices are effective. However, such effort on the part of consumers generally is of no avail because of strict allocation of practical capacity output currently in effect within the industry. Indicated lag in tin plate production throughout the first half due to modernization programs is expected to be made up later in the year, with good prospect that a new production record will be established.

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Structural Shapes . . .

Structural Shape Prices, Page 149

Boston—Bulk of declining structural inquiry is for public work with power plant expansions leading estimates for private construction. Veterans hospitals account for some volume, but most of these buildings are of reinforced concrete. Backlogs with larger shops range from five to six months with smaller district shops becoming more extended due to shortages in plain material. Small tonnages continue to go to the latter shops on a somewhat better delivery basis than larger units.

Philadelphia — While structural contracting in this district recently has been comprised principally of private work, pending tonnage is predominately of public character, with more than 40,000 tons of structurals and cables for the Delaware River Memorial bridge near Wilmington, outstanding. Plans for this project will be issued by the Delaware State Highway Department, Delaware Crossing Division, Dover, Del., Dec. 17 with bids to be closed Jan. 25. Specifications will cover contracts 4, 5 and 6, which involve, respectively, lower and main span, cables and approach work.

Birmingham — New structural business remains spotty despite the large volume of construction in the area. Much shape tonnage is in the offing provided plans materialize.

Los Angeles — Demand for structural materials continues firm, although not as great as it has been in past months. Construction in general continues to ease, with the trend away from heavy projects. Nevertheless, construction of schools, public buildings and small miscellaneous projects remains active.

Wire . . .

Wire Prices, Page 149

Pittsburgh — Producers of galvanized fence and nails are studying current price levels in the light of recent advances in the cost of zinc to 17.50c a pound. One interest is attempting to work out a "formula" pricing system along the lines in effect on galvanized sheets. However, development of such a "formula" is not considered imminent. Requirements for upholstery wire and poultry netting continue to ease. Seasonal influences have had little effect on new business for merchant wire products because of depleted jobbers' inventories.

Boston — Partly due to seasonal influences, but in some cases due to slackening demand from end use sources, buying and pressure for wire products is slower. On other hand, buying is heavy and inquiry is in excess of allotments in some directions and, while suspensions are more numerous, overall level has not dipped much, if any. Most larger consuming industries are taking full allocations. Cold heading wire in larger range of sizes is in better supply.

Birmingham—Wire users continue to disrupt production schedules because of general scarcity of processing wire. Most of those affected are relatively small concerns. Complaint is still heard as to inability to get fencing and nails.

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Plates . . .

Plate Prices, Page 149

Boston — Approaching 40 per cent of total production, plate allocations are steadily narrowing the volume for general distribution; added tonnage on which mills are committed beyond certified volume, including large diameter pipe lines, and requirements for integrated plate fabrication, heads, weldments and flanged work, means plate capacity open for broad distribution is lowest in years. With fabricators becoming more cost minded, press for orders on mills selling 3.40c and 3.45c f.o.b. is overwhelming, although many do not shrink from paying premiums to get steel. Quotas for general distribution are lower first quarter, but heavy carryovers and uncertainty as to additional certified tonnage, holds back definite tonnage scheduling beyond one month in most cases and more revisions may follow. There is a growing increase in the fabrication of clad plates for industrial equipment, notably textile and chemicals; in this area this seems to be at the expense of straight chromium and nickel on a cost basis, rather than a substitute for carbon. Clad plate deliveries range from six to eight weeks.

Philadelphia—Due to a shortage of tubing, some boiler manufacturers have held up shipments on plates, but in general demand for plates is stronger than ever, as shipyard requirements expand and carbuilders press for heavier shipments. Carbuilders claim plates are their most critical item.

Meanwhile, Office of Defense Transportation still presses for heavier steel allocations, so as to build more than the scheduled 10,000 cars per month. While asking for more originally, ODT apparently is now seeking an increase of 2000 cars. The request is expected to be formally presented to the Department of Commerce within the next week or so.

Birmingham — Advent of the first quarter will find backlogs substantial in plates in most instances. The trade generally is not optimistic as to prospects for increased allocations, even though plate production is at capacity. The Gadsden tube mill diversion is being acutely felt, and supplies continue to lag behind general requirements.

Warehouse . . .

Warehouse Prices, Page 151

New York—Allotments to warehouses on specialties, alloys, cold-finished bars and mechanical tubing, first quarter, are not reduced to the extent experienced with carbon products, plates, structurals, hot-rolled bars and flat-rolled. Supply and demand for former named are better balanced than for most carbon steels. No improvement is in sight for the most active carbon products. Merchant steel pipe is also short. Most warehouses are usually able to match alloy demand, although rearmament requirements loom heavier. Overall buying is in excess of supply with a few soft spots, one being business machine lines. Price confusion is holding back some warehouse orders for stainless.

Boston—Warehouse allocations for January have been reduced 30 to 35 per cent by some mills with February-March tentatively nearer current levels, but subject to revision due to expected heavier certified requirements for voluntary allocation. Buyers of warehouse products are more realistic as to ability of distributors to meet their needs which in part accounts for some leveling off in demand. Plates, structurals and flat-rolled are the most critical supply-demand products with prospective tonnage available warehouses next quarter certain to be lower. Alloys are definitely slower on some grades and sizes.

Philadelphia—Jobbers are entering the period of the year where they anticipate a slowing down for holidays and inventory taking. Some look for this slackening to be a little more pronounced than a year ago, because of the greater mixture of business trends and uncertainties resulting. However, they emphasize that they could still sell far more tonnage of sheets, plates and bar-size angles if stocks permitted. Except for an advance in galvanized sheets, reflecting the latest increase in zinc costs, jobber prices are steady.

Stainless steel distributors still look for a restoration of discount schedules by mills, or at least most of them, which took adverse action a few months ago. Some producers are continuing to review the matter seriously.

Seattle — Jobbing houses report some recession in demand due to seasonal conditions and to less buying by the small machine and other metal working shops, many of which have closed until business improves. The maritime strike is responsible in part for this condition. The larger machine shops report normal operations. Jobbers state mill allocations are less than they hoped for and critical items are as tight as ever. Nails are somewhat easier, but there is no improvement in sheets, plates and pipe. Cold-rolled and alloy items are on allocation and supply is well below demand.

New Peacetime Cargo Records

Cleveland — The Great Lakes cargo fleet closed the 1948 season with a strong finish that toppled all previous peacetime cargo records. This was revealed by Lake Carriers Association figures which tallied the movement of commodities up to Dec. 1.

While full season figures are not as yet available, a comparison shows the following records were established: The largest November movement of iron ore, coal and grain for any previous year, totaling 16,069,235 tons; second largest November ore movement in history, total 7,239,451 tons, exceeded only by the war year 1942; third largest cumulative ore movement, totaling 82,436,473 tons, exceeded only by the war years 1942 and 1943; second largest cumulative coal movement, totaling 52,619,974 tons, exceeded only by 1944; and largest postwar November grain shipments, totaling 2,474,860 net tons.

Scrap . . .

Scrap Prices, Page 154

Philadelphia — Cast scrap prices have eased materially, with No. 1 cupola now holding at $62 to $63, delivered; No. 1 machinery, $66 to $67; charging box, $62 to $62.50; clean auto cast, $62 to $63. This situation reflects slackening activity at various foundries and the improved flow of pig iron, especially from abroad. Further reductions in some of the cast grades may develop shortly. Meanwhile, steel grades are steady, except for No. 1 chemical borings on which too little business is now going to establish a market.

Three cargoes of foreign scrap are being unloaded here. The leading eastern consumer has 16 cargoes on the seas, with three coming in from Europe.

Midvale Steel Co., which is now resuming operations after a six-month suspension due to a strike, is expected to enter the market shortly for substantial tonnage of steel scrap.

Boston — Some heavy melting steel scrap continues to move above formula prices with buying somewhat slow. Steelworks consumers in this area are more concerned as to pig iron supply than scrap. One mill continues to operate largely on ship scrap, preparing tonnage with its own forces. Cast is slow, but prices for these grades have not weakened notably. Demand for scrap is largely for outside shipment.

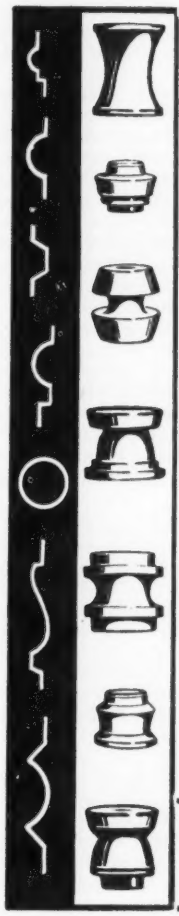
New York—Scrap brokers' buying prices are unchanged throughout the list, but with sentiment easier in cast grades. Steel scrap continues to move actively, despite the fact that consumers are accumulating substantially higher inventories than a year ago. District yards are moving scrap out about as fast as it comes in.

Pittsburgh — Movement of scrap to consumers' yards is well sustained, enabling some interests to continue to augment inventories. Some soft spots are developing pricewise, notably for turnings and cast grades. Trend in scrap prices early next year will depend largely on extent shipments can be maintained over the winter months.

Buffalo—Reports of tapering off tendencies in foundry operations led to price declines ranging from $2 to $3 in the cast scrap market last week. Mixed cupola changed hands at $63 to $64, but No. 1 material still brought as high as $68. One dealer also reported storing cast at these figures in anticipation of a price rebound.

In general, the market seemed to be on the jittery side. Prices on steelmaking grades were unchanged on the surface, but current business was still negotiated primarily on conversion and tie-in sales, which ranged about $2 above open market prices. Nervousness developed over what possible action the new Congress might take on price controls. It was also apparent that dealers were jockeying around on yearend inventories to meet suitable tax adjustments.

Cincinnati — Scrap is moving steadily at established prices, even though inventories of mills are comfortable. The easier supply is indicat-



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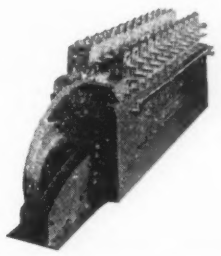

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ed in the insistence on correct grading. Demand for cast scrap is spotty and reflects a decline in the foundry melt.

Chicago—"Pre-holiday slump" is being experienced in the scrap market. Dealer scrap, affected by a "buyers' strike" is definitely weaker. In the opinion of some, the market will remain in its present condition through the end of the year and the price test which is predicted to come at that time will be between maintaining present formula prices or scaling them down to a lower level.

Volume here of dealer scrap buying has tapered in favor of pig iron, but not to the extent necessary to make for substantially lower prices. Mild weather has enabled both mills and foundries to augment inventories beyond their original expectations and they now seem content to take in what they can.

Los Angeles — Although prevailing quotations are unchanged, ranging from $50 to $55 on No. 1 cast, the market has a decidedly soft undertone. There are apparently a number of reasons: Pig iron for castings is available in good quantities, considerable scrap has now been released from the harbor, and scrap demand in general has tapered off.

Pig Iron . . .

Pig Iron Prices, Page 150

Pittsburgh—Merchant iron supply continues tight here despite reported easing in operations among a few jobbing foundries. This is attributed to the heavy requirements from captive foundries and those producing castings for heavy steel mill equipment and maintenance. Jobbing foundries report order backlogs substantially reduced in recent weeks and some have curtailed operations to three or four-day per week basis. Basic iron production here has been increased with the resumption of output at Pittsburgh Steel Co.'s No. 2 furnace at Monessen, Pa., raising company's daily iron output to around 2400 tons. This furnace was blown out last spring when company initiated operations at its DPC 1200-ton furnace purchased about a year ago. During the interim additional raw material handling facilities were installed at company's Monessen plant. Output of the No. 2 furnace will be restricted to basic iron and is expected to make the company less dependent on scrap. No decision yet has been reached regarding sale of any excess basic iron in the open market.

New York — Imported pig iron is in less demand, with prices still easier. Prime material is now being offered at $75 to $80, c.i.f., with the inside figure the more representative. Softness in foreign prices is due not only to a better supply on this side but to the fact that foundry operations are somewhat easier. In the main, demand for domestic iron still exceeds supply, but in the case of foreign iron this is not the situation because premiums are still too high and deliveries are uncertain.

Shrinkage in demand for castings is hitting the small jobber foundries most. Those identified as an integral part of some of the larger consuming companies appear to be operating at the highest level. Certain of these larger consumers are no longer farming out casting work, and this is being particularly felt by some of the smaller jobbers.

Boston — Melt is off substantially with more small foundries, notably those affected by loss of subcontracts without backlog replacements. Larger shops building textile machinery are farming out a minimum of tonnage and doing more in the home foundry. Their melt is generally holding; several at the peak of their activity placed work with 40 or more foundries, but gradually called in volume until six or eight remain. The last dropped had small or no backlog of other orders. While pressure for pig iron has eased, average ratio of iron to scrap in melts is around 25 per cent and melters want to raise this to 45 per cent iron which would permit improved castings and lower costs.

Glenwood Range Co., Taunton, Mass., is closing its foundry; there are few cast iron kitchen stove shops left, one or two in Maine. Glenwood in the future will buy what castings are required.

Philadelphia — Foreign iron is being unloaded more freely since the termination of the longshoremen's strike, but few new contracts are being reported, and prices are softer. Where prime foreign iron is in this country and is available for immediate shipment, importers can obtain around $75 c.i.f., but on shipments for first quarter it would appear that they could get no more than $70 and possibly less. One eastern foundry recently resold a portion of its foreign iron, taking a loss rather than carry it in inventory. As a result of the special activity in unloading shipments of pig and scrap which accumulated during the maritime strike, another and more severe shortage in gondolas is noted along the eastern seaboard.

Increasing spottiness is noted in the foundry field, which will probably be augmented over the remainder of the year by seasonal influences. Oven coke supply is improving and the Swedeland, Pa., coke oven repair program is expected to be completed by Jan. 1, three or four weeks ahead of schedule.

The Chester, Pa., furnace is expected to get into blast this week, with production at first averaging around 250 tons of basic daily. By late January, when new blower equipment is expected to be installed, production should reach 400 tons daily.

Buffalo—While there are definite signs of a falling off in foundry operations, some melters maintain the letup is being over-emphasized. Gray iron foundries have curtailed operations and laid off workers, due primarily to the fact that order backlogs for household appliances have been slashed drastically. A survey of leading casters also revealed that casting buying in some instances was down because manufacturers cannot get the steel needed to go with the castings to make the finished product.

Cincinnati — The foundry melt in this district is lighter, but this is not reflected in demands for pig iron. Either foundries want to cut the proportion of scrap, or build stocks of pig iron, or both. Pressure for deliv-

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eries is as great as ever. The melt for heating equipment continues heavy, but jobbing foundries are hunting castings business. Suppliers of northern iron are trying to keep deliveries at quotas fixed earlier in the year. Principal lag now is in shipments from some of the southern furnaces.

Chicago—Decline in order backlogs with many jobbing foundries leads observers to believe the industry is now beginning to get back to normal from its war and postwar boom. While shortened work-weeks are not of recent origin, their cause seems to have changed to some extent from lack of materials to lack of business. A number of captive foundries also are noticing the decline.

Oliver Produces Peak Tonnage

Cleveland — Final cargoes of iron ore loaded into two ships at Duluth last Wednesday will bring to more than 25 million tons the 1948 season's movement by the Pittsburgh Steamship Co.'s fleet of 62 vessels, the company announced. This is a new peacetime record for the fleet and compares with former record of 23,400,000 tons established last year.

"The major factor involved in this record-breaking season was the unusually favorable weather experienced during both the beginning and the latter part of the shipping season," said Walter C. Hemingway, president.

Oliver Iron Mining Co., another subsidiary of the United States Steel Corp., closed its 1948 ore shipping season last week with an all-time record of 36,526,000 tons of iron ore, R. T. Elstad, president, announced in Duluth. In 1947, shipments of iron ore by Oliver totaled 35,641,000 tons.

Iron Ore . . .

Iron Ore Prices, Page 150

Cleveland — Shipments of Lake Superior iron ore from the upper lake ports dropped during the week ended Dec. 6 to only 586,676 tons as the season's end approaches, according to the Lake Superior Iron Ore Association, this city. This brought the season's total to Dec. 6 to 82,827,418 tons compared with 77,898,087 tons for the like 1947 period. Shipments from United States ports totaled 81,636,296 tons, an increase of 5,368,868 tons over the 76,267,428 tons reported during the like 1947 period.

Rails, Cars . . .

Track Material Prices, Page 149

New York — November freight car awards totaled 4852 units, bringing the first 11 months' total up to 89,995, compared with 117,493 during the same period in 1947, according to the American Railway Car Institute. Backlogs as of Dec. 1 were 106,402 against 111,504 a month earlier and 125,395 a year ago.

Of the November awards, 3277 went to car builders and 1575 to car shops. Orders for gondolas total 1208 units. November deliveries amounted to 9286, against 8934 in October. Of last month's total, 6979 were delivered by car builders and

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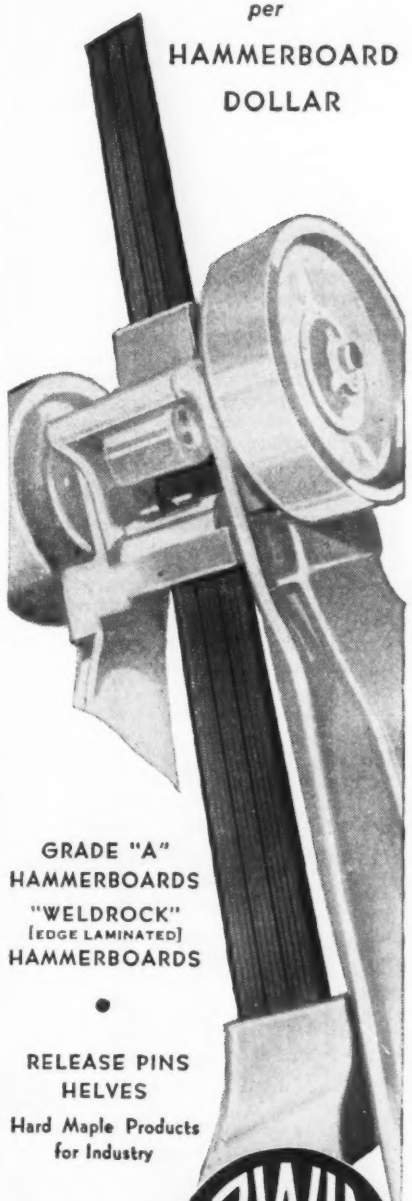

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2307 by car shops. Production of the leading types was: Hopper, 3394; box, 2242; gondola, 1934; refrigerator, 826.

Ferroalloys . . .

Ferroalloy Prices, Page 151

New York — Electro Metallurgical Sales Corp. has increased some prices on some of the silicon alloys and on ferrocolumbium due to increased power and raw material costs. The price changes are effective as of Dec. 8 on a spot basis and Jan. 1 on a contract basis.

The new price for 50 per cent ferrosilicon is 11.3c a pound on contained silicon. Other increases are as follows: 65 per cent ferrosilicon, 1 cent a pound of contained silicon; 75 per cent ferrosilicon, 0.5 cent a pound of contained silicon; silicon briquets, 0.4 cent a pound. The new base price for ground 15 per cent ferrosilicon is $136.50 a gross ton for the 65 mesh by down sizes; $139.50, 100 mesh and down. Prices for other silicon alloys were not changed.

Ferrocolumbium was increased 15 cents a pound of contained columbium to $2.90.

Auto Service Show Held

CHICAGO'S Navy Pier was decorated last week with road signs pointing the way toward greater business opportunities for 20,000 representatives of automotive parts manufacturing and distributing companies.

It was the scene of the automotive service industries show in which 520 exhibitors were participating. Sponsors were the Motor & Equipment Wholesale Association, Motor & Equipment Manufacturers Association and National Standard Parts Association. On display were virtually every type of product used in servicing automotive vehicles, as well as a wide variety of accessories and replacement parts.

Officials pointed out that orders for replacement parts are still at high level, having decreased only slightly from peaks attained during and immediately after the war. An estimated $4 billion will be spent this year to keep 41 million cars in running order.

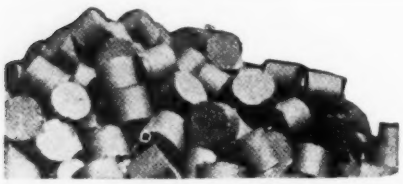
Steel Payroll Sets Record

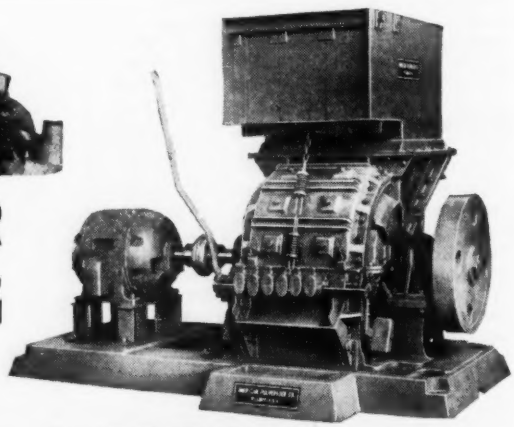
New York—Marking the first time the monthly payroll of the iron and steel industry exceeded $200 million, the October figure totaled $201,668,000. That, according to the American Iron & Steel Institute, was $2,228,000 above September and $21 million higher than October, 1947. In ten months of 1948 the total was over $1,828,800,000, or 11.5 per cent greater than in the corresponding 1947 period.

Earnings of hourly, piecework, and tonnage workers averaged $1.699 per hour in October, 1.9 cents less than the record September average but 15.3 cents above October, 1947.

Estimated employment for the whole industry in October was 644,100, an increase of 3400 in a month and 24,500 in a year. However, it was 400 less than the peak reached in August.

Average work week of wage earners in October was 39.5 hours, compared with 40.1 in September.





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STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2000 tons, telephone exchange building, Portland, Oreg.; to Columbia Steel Co., Portland.

1500 tons, Du Pont fibre plant, Camden, S. C., to Bethlehem Steel Co.

925 tons, veterans' hospital, Chelsea, Mass., to Bethlehem Steel Co.; M. S. Kelliher Co., Boston, general contractor.

800 tons, power house, New England Power Co., Worcester, Mass., to Bethlehem Steel Co.

650 tons, Washington state Manette bridge, to Pacific Car & Foundry Co., Seattle; MacRae Bros., Seattle, general contract, $661,060.

600 tons, power plant, Fox Lake, Minn., Interstate Power Co., to Vierling Steel Works, Chicago; Sargent & Lundy, engineers.

575 tons, transmission towers, Pennsylvania Power & Light Co., Allentown, Pa., for erection near Lancaster, Pa., to Lehigh Structural Steel Co., Allentown.

554 tons, bridge, Pennsylvania Railroad, Buffalo, to Bethlehem Steel Co.; Metzger Construction Co., Buffalo, general contractor.

400 tons, galvanized steel transmission towers for Seattle City Light, to Columbia Steel Co., Seattle.

350 tons, power plant, General Electric Co., Lynn, Mass., to Ernst Iron Works, Buffalo; Stone & Webster Engineering Corp., Boston, contractor-engineer.

350 tons, bridge deck grill, Manette bridge, Bremerton, Wash., to Columbia Steel Co., Seattle.

265 tons, store, Strawbridge & Clothier, Ardmore, Pa., to Bethlehem Steel Co.

260 tons, three store buildings, Fresh Meadows, 187th St. & Horace Harding Blvd., Flushing, Long Island, to Grand Iron Works, New York.

130 tons, service building, Cincinnati Gas & Electric Co., Cincinnati, through Day & Zimmerman, Philadelphia, to Bethlehem Steel Co.

125 tons, St. Francis of Rome school, Cicero, Ill., to Duffin Iron Co., Chicago.

STRUCTURAL STEEL PENDING

40,000 tons, Delaware River Memorial bridge, near Wilmington, Del.; bids to state highway department, Delaware Crossing Division, Dover, Jan. 25.

4425 tons, superstructure, Housatonic river bridge, Shelton-Derby, Conn., American Bridge Co., Pittsburgh, low, bids Dec. 6; if girders are welded tonnage is 4155 tons; nine girder spans for main viaduct and three riveted deck trusses over river; two viaduct ramps consist of four and five girder spans respectively.

2000 tons, Alaska Army barracks, bids to Birch, Lytel & Johnson, general contractors, Seattle, Dec. 15.

800 tons, enlargement of Philadelphia-Camden bridge; pending.

300 tons, also 85 tons reinforcing, Columbia river highway, overpass; Valley Construction Co., Portland, Oreg., low $326,318 and recommended by Public Roads Administration.

252 tons, bus and rack structure Seattle City Light; bids late December.

150 tons, junior high school, 58th St., Philadelphia; bids due shortly.

125 tons, state bridge work, Berks county, Pennsylvania, bids Dec. 21.

110 tons, state bridge work, York county, Pennsylvania, bids Dec. 21.

Unstated, Canyon Ferry dam, Montana; general contract bids in.

Unstated, memorial student building, Univer-

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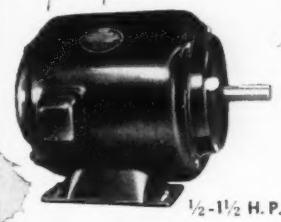

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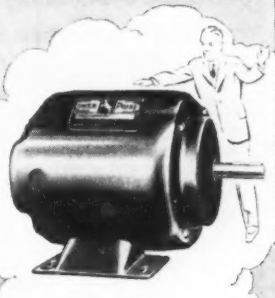

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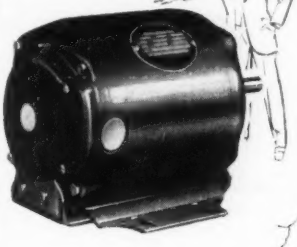

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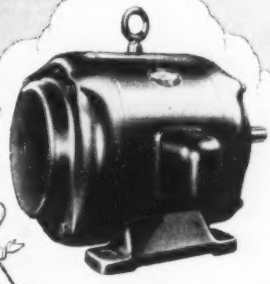

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REINFORCING BARS . . .

REINFORCING BARS PLACED

1020 tons, power plant, Nichols, Minn., Northern States Power Co., to United States Steel Supply Co., St. Paul.

300 tons, miscellaneous construction projects in Washington state to Bethlehem Pacific Coast Steel Corp., Seattle.

107 tons, St. Francis of Rome school, Cicero, Ill., to Joseph T. Ryerson & Son Inc., Chicago.

Unstated, tuberculosis pavillion, Troutdale, Oreg., to Mercer Steel Co., Portland.

Unstated, Erb Memorial student building, Oregon State University, Eugene, also Portland Traction Co. freight depot Portland, to Soule Steel Co., Portland.

REINFORCING BARS PENDING

6500 tons, Columbia Basin projects; bids to Bureau of Reclamation about Dec. 22 and 31 respectively.

2000 tons, Canyon Ferry dam, Montana; joint low bid $12,940,845 in to Bureau of Reclamation.

1000 tons, military barracks in Alaska; bids to Birch, Lytel & Johnson, Seattle, general contractors, about Dec. 15.

475 tons, auxiliary outlet sewers, Beverly-Calumet sewer system, cont. 1-B, Chicago; bids to Department of Purchases, Chicago, Dec. 17.

Unstated, bridge in Cascade county, Montana; low bid of $249,576, by Union Construction Co., Missoula, recommended by Public Roads Administration.

Unstated, Bonneville Power Administration substation, Snohomish, Wash.; general contract to Ray R. Kelly & Co., Tacoma, low $141,600.

Unstated, pumping plant addition, Wenatchee, Wash.; Vandivort Construction Co., Wenatchee, low $69,749.

PLATES . . .

PLATES PLACED

300 tons, sheet piling, Manette state bridge, Bremerton, Wash., to Columbia Steel Co., Seattle.

Unstated, 15,600 feet 20 inch gravity water supply line for Anchorage, Alaska; award to Armco Steel Corp., Portland, Oreg.

PLATES PENDING

Unstated, Seattle water system improvements; bids Dec. 9.

RAILS, CARS . . .

RAILROAD CARS PLACED

Ann Arbor, 60 seventy-ton covered hopper cars, to Pullman-Standard Car Mfg. Co., Chicago.

Chicago, Rock Island & Pacific, 200 box cars to be converted into stock cars at own shops, at the rate of approximately 75 cars a month.

Denver & Rio Grande Western, 25 seventy-ton covered hopper cars, to Pullman-Standard Car Mfg. Co., Chicago.

Denver & Rio Grande Western, 500 fifty-ton drop-bottom gondolas, to Pressed Steel Car Co., Pittsburgh; 200 seventy-ton drop-bottom gondolas, to Pullman-Standard Car Mfg. Co., Chicago.

Great Northern, 500 fifty-ton gondolas and 100 seventy-ton covered hoppers, to Pullman-Standard Car Mfg. Co., Chicago.

Spokane, Portland & Seattle, 100 fifty-ton gondolas, to Pullman-Standard Car Mfg. Co., Chicago.

RAILS PLACED

Bangor & Aroostook, 5579 tons, to Bethlehem Steel Co.

Central of New Jersey, 4000 tons, to Bethlehem Steel Co.

CONSTRUCTION AND ENTERPRISE

LOUISIANA

BATON ROUGE, LA.—Ethyl Corp., John H. Schaefer, vice president, plans to build a $10 million unit for production of tetraethyl lead.

BATON ROUGE, LA.—Ethyl Corp. has awarded a $623,000 contract to Caldwell & McCann, Triad Bldg., for construction of a development laboratory and pilot plant building; Bodman & Murrell, 713 Reymond Bldg., architects.

BATON ROUGE, LA.—Standard Oil Co., M. W. Boyer, vice president, has awarded a $3 million contract to John W. Harris Associates for an office building and cafeteria on Scenic Highway; Lathrop Douglass, architect for office building; Bodman & Murrell, architects for cafeteria.

MARYLAND

BALTIMORE—F. A. Lazenby & Co., 3601 Elm Ave., manufacturer of textile machinery, is building a plant addition.

BALTIMORE — Canton Railroad Co., 300 Water St., has awarded a contract for the erection of a diesel locomotive house and repair shop at 3500 Newgate Ave.

BALTIMORE — Lenderking Metal Products Inc., 1000 S. Linwood Ave., manufacturer of sheet metal products, is erecting a manufacturing addition.

BALTIMORE—Tidewater Steel Drum Co. has taken over the space formerly occupied by the Baltimore Steel Drum Co., 1539 Ridgley St., to engage in the reconditioning of metal containers.

BALTIMORE — Chesapeake Metal Finishing Co. has commenced operation in its new plant at Whitelock and Kelly Aves., Mt. Washington, where it will engage in a general line of metalplating.

BALTIMORE—Zimco Inc., engaged in machine tool work, has moved from 12 E. Pratt St. into larger space at 415 E. Oliver St.

BALTIMORE—American Brake Shoe Co., 2001-2045 Winchester St., is installing new equipment in its air compressor room.

BALTIMORE—Westinghouse Electric Supply Co., Calvert & Lombard Sts., a distribution and warehouse subsidiary of Westinghouse Electric Corp., will erect a building at Franklin St. & Warwick Ave.

BALTIMORE—W. H. Killian Co., 700 S. Eden St., canning firm, has been sold, Andrew H. Graham becoming president and William Keiffer, general manager. New management plans plant improvements, but will operate under its former name and personnel.

BALTIMORE—Dworkin & Sachs, sheet metal workers specializing in restaurant and dining room equipment, has moved from 415 N. Exeter St. into larger space at 1617 Hillen St.

BALTIMORE—American Radiator & Standard Sanitary Corp., 5315 Holabird Ave., manufacturer of cast iron enamel plumbing fixtures, plans to erect an office building, thereby releasing present office facilities for warehouse space, a warehouse building and a cleaning house.

BALTIMORE—Standard Wholesale Phosphate & Acid Works Inc., Curtis Bay, is completing an addition to its sulphuric acid department which will bring its daily capacity to around 2500 tons. The company is also building a structure for the manufacture of super phosphate.

CUMBERLAND, MD.—Kelly Springfield Tire Co. plans to spend $1 million on power plant improvements; plans by Sergent & Lundy, 140 S. Dearborn St., Chicago.

PENNSYLVANIA

AMBRIDGE, PA.—General Motors Corp., Fisher Body Div., General Motors Bldg.,

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Detroit, plans to convert the war surplus old American Bridge Navy plant for blanking steel for automobile bodies at a cost of $2 million.

GROVE CITY, PA.—Cooper Bessemer Corp. has awarded a $100,000 contract to Montgomery Construction Co., 801 W. Main St., for a storage shop and stoker building addition.

NEW CASTLE, PA.—Pennsylvania Power Co., L. B. Round, vice president, and general manager, plan to spend $12 million for a generator and auxiliary buildings.

PHILADELPHIA—Plant Manufacturers Co., Fifth and Willow Sts., is planning to erect a $1,500,000 manufacturing plant and offices on Bustleton Ave. near Fulmer St.

PHILADELPHIA—Mauck-Hill Corp., c/o John W. Galbreath & Co., agent, 42 E. Gay St., Columbus, O., has awarded a $300,000 contract to Turner Construction Co., 1500 Walnut St., for construction of a warehouse including office space and garage on Erie and D Sts.; Carroll, Grisdale & Van Allen, 1616 Walnut St., Philadelphia, architects.

WEST MIFFLIN, PA.—General Motors Corp., Fisher Body Div., General Motors Bldg., Detroit, plans to spend $5 million on a stamping plant, main manufacturing building, craneways, power plant, administration and offices; Argonaut Realty Co., 310 Research Bldg., Detroit, engineer.

TENNESSEE

PARIS, TENN.—Edgar T. Ward Co., River Forest, Ill., plans to build a $125,000 factory.

TEXAS

BEAUMONT, TEX.—Gulf States Utilities Co., 362 Liberty St., plans to spend $4 million to expand the Neches Steam Power Station.

HOUSTON—L. B. Foster Co., Pittsburgh, J. B. Strauss, Southwest district manager, is planning a $70,000 expansion program which will include the construction of two metal warehouses for handling spikes, bolts and other track specialties, and other improvements on Homestead Rd. Some light fabrication of track specialties will be done at the plant, but for the most part the operations will be specialty warehousing. A larger development program is planned for next year.

VICTORIA, TEX.—E. I. du Pont de Nemours & Co., La Porte, is planning to construct an $8 million nylon chemical plant.

WASHINGTON

SEATTLE—Northern Pacific Railway Co., B. Blum, chief engineer, 176 East Fifth St., St. Paul, has awarded a general contract to Noble W. White, Pier 65, for construction of a $125,000 boiler plant, mechanical work to be done by University Plumbing & Heating Co., 3939 University Way.

CANADA

TORONTO, ONT.—Canada Cycle & Motor Co. Ltd., 7 Laurence Ave., has awarded a $100,000 contract to Carter Construction Co. Ltd., 2119 Cherry St., for construction of a plant addition; Margison & Babcock, 119 Isabella St., engineers.

MONTREAL, QUE.—Dominion Oilcloth & Linoleum Co. Ltd., 2300 St. Catherine St. E., has awarded a $400,000 contract to J. L. E. Price & Co. Ltd., 680 W. Sherbrooke St., for erection of a plant addition; Wood & Langston, 204 Notre Dame St. W., engineers.

MONTREAL, QUE.—Canadian Pacific Railroad, J. E. Armstrong, chief engineer, Windsor Station, has awarded contracts of $1 million and $350,000 to Charles Duranceau Ltd., 2545 Jacques Hertel St., for construction of an engine house in Montreal, store building, and car repair shop in Cote St. Luc. J. J. Richardson, 401 Windsor Station, engineer.

PRICES OF LEADING FERROALLOYS PRODUCTS

(*Continued from Page* 151)

packed 12.1c, ton lot 13.55c, less ton 15.2c. Delivered. Spot, add 1.25c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.0c per lb of contained Si, carload packed 14.3c, ton lot 15.45c, less ton 16.7c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk 14.65-15c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.) Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe.). C.l., lump, bulk, regular 19.0c per lb of Si c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump per lb cl 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c, smaller lots 8.65c; or, lump, carload, bulk, 8.40c per lb of alloy, packed c.l. 9.20c, ton lots 9.30c, 200 to 1000 lb 9.65c, less 200 lb 10.15c per lb of alloy. Delivered. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅜ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk, 10.00c per lb of briquet, c.l. packaged 10.8c, ton lot 11.6c, less ton 12.5c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3⅛ lb and containing exactly 2 lb of Mn and approx. ⅛ lb of Si). Contract, c.l. bulk 10.0c, per lb of briquet, c.l. packed 10.8c, ton lot 11.6c, less ton 12.5c. Delivered. Add 0.25c for notching. Spot, add 0.65c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 5.75c per lb of briquet, c.l. packed 6.55c, ton lot 7.35c, less ton 8.25c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 5.90c, c.l. packed 6.70c, ton lots 7.50c, less ton 8.40c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 80.00c per pound of Mo contained. f.o.b. Langeloth, Pa.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.). Contract, ton lots, 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.). Ton lot $1.28, less ton $1.35. F.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon (Ti 15-18%, C 6-8%). Contract, $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21% C 3-4.5%). Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 3.25-4% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.), $3.10.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb of contained V_2O_5, f.o.b. Bridgeville, Pa. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all f.o.b. Bridgeville, Pa., usual freight allowance.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more. 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c.

Borosil: (3 to 4% B, 40 to 45% Si), $6.25 per lb contained B, f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, f.o.b. Suspension Bridge N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max Si 8% max., C 0.5% max.). Contract, ton lot, 2" x D, $2.75 per lb of contained Cb, less ton $2.80. Delivered. Spot, add 25c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Carload, packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ¼" x 12 M, 16.5c per lb of alloy, ton lots 17.25c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 16.50-17.00c per lb of alloy; ton lots 17.90-18.00c; less ton lots 19.40-19.50, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%; V-7, Cr 28-32%, Si 15-21%, Mn 14-16%). C.l. packed, 14.25c per lb of alloy; tons lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Packed, lump, carload 11c, ton lots 11.25c, smaller lots 11.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base): Gross tons per carload, f.o.b. sellers' works, Mt. Pleasant, or Siglo, Tenn.; $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c. Effective Jan. 1, 1949, price will be $1.10 Langeloth.

Technical Molybdic-Oxide: Per lb, contained Mo, f.o.b. Langeloth, Pa., packed in bags containing 20 lb of molybdenum, 80.00c.